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DETECTION OF FRAUD

AND

PROTECTION OF HEALTH.

THE END OF THE WORLD

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July 13
1852
DETECTION OF FRAUD AND PROTECTION OF HEALTH.

A TREATISE

ON THE

ADULTERATION OF FOOD AND DRINK:

WITH

PLAIN AND SIMPLE DIRECTIONS FOR DETECTING THEM;

AND OF

THE DELETERIOUS INFLUENCE OF LEAD ON THE HUMAN
SYSTEM, MEANS OF PREVENTING ITS INFLUENCE,
TREATMENT OF LEAD AFFECTIONS, AND OF
THE PROCESS FOR DETECTING LEAD
WHERE PRESENT.

WITH

AN APPENDIX,

GIVING NEARLY

ONE HUNDRED RECIPES

FOR MAKING

TOOTH POWDERS AND WASHES, HAIR OILS, HAIR DYES, POMADES,
SKIN POWDERS, PERFUMES, SOAPS, CONFECTIONS,
ESSENCES, SYRUPS, TINCTURES, ETC.

BY

M. L. BYRN, M. D.

GRADUATE OF THE UNIVERSITY OF THE CITY OF NEW YORK.

PHILADELPHIA:
LIPPINCOTT, GRAMBO, AND CO.
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TO
WILLIAM B. BYRN, ESQ.,

OF RUTHERFORD COUNTY, TENNESSEE,

THIS LITTLE VOLUME

IS INSCRIBED, IN GRATEFUL REMEMBRANCE

OF EARLY KINDNESS, BY HIS STEADFAST FRIEND AND

AFFECTIONATE BROTHER,

THE AUTHOR.

P R E F A C E.

Is the question asked: "Why have the following pages been written, what will be accomplished, who will be benefited?" If so, I answer, I have written them from a sense of duty: one that I owe to myself, to my God, and to the world. Suffering humanity calls aloud for relief; the father who, by poisonous articles of diet, vended by those in whom he had confidence, has seen his child, the idol of his heart, consigned to a premature grave, calls for the work. The unsuspecting public, who are daily taking a slow *poison*, and from which cause they are often thrown upon a bed of languishing and affliction; who are scorched with fever, and racked with pain, need such a work. If the public will only for one moment consider what the adulteration of food and drink has done, they will at once admit that such a book is needed. This sophistication of food and drink has "slain its thousands, and tens of thousands." It has taken

from us the brightest ornaments of society. It has torn the dear parent from dutiful and affectionate children! It has taken from the mother the brightest hope of her declining years, and made her life a misery. But it is unnecessary to say more in a preface, as I trust that, in the perusal of the work, every one will see and know for themselves, that "*in the midst of life we are in death*," and I sincerely hope that some means will be taken to put a stop to this trifling with human life and human happiness, and that ere long we shall see the place of *poisons* supplied by nature's own healthful productions; that we may see the establishments, and the owners thereof, that manufacture those articles so deleterious to health, sink into merited oblivion, never again to rise. If this little work should be the means of awakening the public mind to a sense of duty, that shall result in some good for the present and future generations, I shall feel happy in thinking that my labor has been appreciated, and that in future years, when I have left this scene of action, my name will still live, in remembrance of this philanthropic and bold undertaking.

M. L. BYRN, M. D.

NEW YORK, June, 1852.

CONTENTS.

CLASSIFICATION.

	PAGE
CLASS I.—ARTICLES OF FOOD.	
1. Arrowroot	13
2. Bread	14
3. Cheese	19
4. Cream	21
5. Coffee	22
6. Chocolate	24
7. Common Salt	25
8. Flour	25
9. Hog's Lard	26
10. Honey	27
11. Meats	28
12. Milk	28
13. Pickles	51
14. Sago	53
15. Tea	53
16. Tapioca	57
CLASS II.—SPIRITUOUS AND MALT LIQUORS, &c.	
1. Beer	58
2. Brandy	64
3. Gin	65

	PAGE
4. Porter	66
5. Rum	66
6. Wines	66
7. Whiskey	71

CLASS III.—CONFECTIONERY, SPICES, &c.

1. Preserves	72
2. Pepper (black)	74
3. Pepper (white)	74
4. Candies	75
5. Mustard	77
6. Nutmegs	78
7. Ice-Cream	78
8. Sweet Oil	80

CLASS IV.—MISCELLANEOUS ARTICLES.

1. Alum	82
2. Cider	82
3. Gunpowder	84
4. Indigo	84
5. Sealing-wax	85
6. Soaps	86
7. Starch	87
8. Soda-water (spurious soda-water in bottles)	87
9. Vinegar	89
10. Water	91
11. Beeswax	94

CLASS V.—LEAD: ITS INFLUENCE ON THE HUMAN SYSTEM.—MEANS OF PREVENTING ITS DELETERIOUS EFFECTS.—TREATMENT OF LEAD AFFECTIONS, AND PROCESS FOR DETECTING LEAD WHERE PRESENT	96
---	----

CONTENTS.

xi

	PAGE
Conclusion	132
Appendix	139
Tooth Powders and Washes	140
Remedies for Toothache	144
Hair Oils, Washes, Perfumes, &c.	145
Pomades	148
Hair Dyes	149
Preparations for the Skin	150
Perfumes for Scent Boxes, &c.	154
Perfumes for the Handkerchief, &c.	155
Soaps	161
Confections	162
Miscellaneous Articles	163

CLASS I.

ARTICLES OF FOOD.

1. Arrowroot.—2. Bread.—3. Cheese.—4. Cream.—5. Coffee.—6. Chocolate.—7. Common Salt.—8. Flour.—9. Hogs' Lard.—10. Honey.—11. Meats.—12. Milk.—13. Pickles.—14. Sago.—15. Tea.—15. Tapioca.

1. ARROWROOT.

THIS very useful article is obtained from a plant growing in the West Indies. If pure, it is in the form of a light white powder, or small pulverulent masses; when pressed between the fingers it has a firm feel, and is entirely destitute of taste or smell. A fraudulent imitation of arrowroot is made from potato-starch. This can be detected in two or three ways; but as this work is intended for the non-professional, none but the simplest tests will be given, such as can be performed by almost every person.

Tests.—Take some of the arrowroot, put into a mortar or common bowl, add a little nitric acid (*aqua-fortis*), diluted with twice its bulk of water. Rub up well for five minutes with a pestle, or a piece of round, smooth wood; and if there is any potato-starch present, immediately a transparent thick paste or jelly will be formed. If the arrowroot is pure, the appearance will be opaque or

cloudy, and will take much longer to become viscid and thick. The arrowroot also is destitute of the fetid, unpleasant smell, that we have when working with the potato-starch. A corresponding test of the purity of this article is its white color, and the entire absence of smell or taste. *Arrowroot differing from the description here given should always be rejected.*

2. BREAD.

Bread, made of wheaten flour, is one of the articles of food in which a fraud very deleterious to health is practised, that the baker may produce a beautiful white bread out of an inferior article of flour. Knowing that the goodness of bread is estimated by its whiteness, it is the rule of the baker to add a certain quantity of *alum* to the dough; this improves the appearance of the bread very much, and renders it whiter and firmer. Good white and porous bread may certainly be made from *good* wheaten flour alone; but to produce the degree of whiteness rendered indispensable by the caprice of the consumers, it is necessary (unless the very best of flour is used) that the dough should be *bleached*; and no substance has hitherto been found to answer this purpose better than alum. Without this salt, it is impossible to make bread from the kind of flour usually employed by bakers, so white as that which is generally sold in all cities. If the alum be omitted, the bread has a slight yellowish gray hue—as may be seen in the instance of what is called home-made bread, of private families. Such bread remains longer moist than bread

made with alum; yet it is not so light, and is full of eyes, or porous, and it has also a different taste.

The quantity of alum requisite to produce the desired whiteness and porosity, depends entirely upon the genuineness of the flour, and the quality of grain from which the flour is obtained. Thus we can see that the meaner the flour the more alum we have to eat. The meal-man makes different sorts of flour from the same grain. The best flour is mostly used by the biscuit-bakers and pastry-cooks, and the inferior sorts in making bread. The bakers' flour is very often made of the worst kinds of damaged wheat, and other grains mixed with them in grinding the wheat into flour; such as common beans and peas.

I have been assured by several bakers on whose testimony I could rely, that the *small profit* attached to the bakers' trade, and the bad quality of the flour, induces the most of bakers to use alum in the making of their bread. The smallest quantity of alum that can be employed with the effect to produce a white, light, and porous bread, from an inferior kind of flour, I have been told, is from three to four ounces to a barrel of flour. The alum is either mixed well in the form of powder, with a quantity of flour previously made into a liquid paste with water, and then incorporated with the dough; or the alum is dissolved in the water employed for mixing up the whole quantity of the flour for making the dough.

Let us suppose that the baker intends to convert one barrel of flour into loaves with the least adulteration practised. He pours the flour into the kneading-trough, and sifts it through a fine wire

sieve, which makes it lie very light, and serves to separate any impurities with which the flour may be mixed. Two ounces of alum are then dissolved in about a quart of boiling water, and the solution poured into the seasoning-tub. Four or five pounds of salt are likewise put into the tub, and a quantity of hot water. When the mixture has cooled down to the temperature of about 80° , three or four pints of yeast are added; the whole is mixed, strained through the seasoning-sieve, emptied into a hole in the flour, and mixed up with the requisite portion of it to make it of the consistence of a thick batter. Some dry flour is then sprinkled over the top, and it is covered up with cloths.

In this situation it is left about three hours. It gradually swells, and breaks through the dry flour scattered on its surface. An additional quantity of warm water, in which one ounce of alum is dissolved, is now added, and the dough is made up into a paste as before; the whole is then covered up. In this situation it is left for a few hours.

It is then intimately kneaded with more water for upwards of an hour. The dough is cut into pieces with a knife, and penned to one side of the trough; some dry flour is sprinkled over it, and it is left in this state for about four hours. It is then kneaded again for half an hour. The dough is now cut into pieces and weighed, in order to furnish the requisite quantity to each loaf. The loaves are left in the oven about two hours and a half. When taken out they are carefully covered up, to prevent as much as possible the loss of weight. The theory of the bleaching property of

alum, as manifested in the purification of an inferior kind of flour, is by no means well understood; and, indeed, it is really surprising that the effect should be produced by so small a quantity of that substance, three or four ounces of alum being sufficient for a barrel of flour.

Another substance employed by fraudulent bakers, is subcarbonate of ammonia. With this salt, they realize the important consideration of producing light and porous bread from *spoiled*, or what is called *sour* flour. The ammonia which becomes converted into a gaseous state, during the operation of baking, causes the dough to swell up into air-bubbles, which carry before them the stiff dough, and thus it renders it porous; the salt itself is, at the same time, totally volatilized during the operation of baking.

Potatoes are likewise largely used by unprincipled bakers, as a cheap ingredient to enhance their profit. The potatoes being boiled, are mashed, passed through a sieve, and incorporated with the dough by kneading.

Such are the artifices practised in the preparation of bread,* and it must be allowed that they are bad enough, as the alum will produce a bad effect, more especially with children that eat at times a quantity of bread; but there is one that is still more reprehensible, I mean the mixing of sulphate of copper (common blue-stone) with the dough before baking. It is used to hide any

* There are instances of convictions on record, of bakers having used gypsum, chalk, and pipe-clay, in the manufacture of bread.

bad quality of the flour; and, by the admixture of a little carbonate of magnesia, at the same time, it accomplishes the end. Thus we are deceived, and swallow down articles of diet that are entirely unfit for assimilation in the stomach of a brute, much less a human being. And how often is it the case that we see persons in the bloom of health take their supper, consisting, perhaps, of little else than tea and bread, and in a few minutes they are writhing in agony and pain? What is the cause? They have been eating an article of bread that contains the blue-stone just spoken of, and they often spend a day and night, and sometimes longer, in this condition, not knowing that such things are put in bread. Many instances could be given where the remaining loaf has been found to contain the copper in such quantity that it was seen in the form of *small crystals in the bread*.

Test for Alum.—Pour upon two ounces of the suspected bread, half a pint of boiling distilled water, or pure rain water; boil the mixture for ten minutes, and strain it through unsized paper. Boil down the fluid to about one-fourth of its original bulk, and let gradually fall into the clear fluid a solution of muriate of barytes. If a *copious* white precipitate settles to the bottom of the vessel, which does not disappear by the addition of *pure* nitric acid (*aqua-fortis*), the presence of alum must be suspected. Bread, made without alum, produces, when treated in this manner, a *very slight* precipitate, which originates from a minute quantity of sulphate of magnesia, contained in all common salt of commerce; and bread made without the salt, produces an infusion with water,

which does not become disturbed by the process just mentioned. More minute processes could be given, but they would not be of much service to those unacquainted with chemistry. If more is needed, make the same experiment on home-made bread, known to be pure, and compare the two results.

Test for Sulphate of Copper, or Blue-Stone.—This can be detected by acting on the poisoned bread with distilled or rain water, and testing the water with a solution of ferro-cyanide of potassium, when the reddish-brown precipitate, characteristic of the presence of copper will appear, even if the quantity is very small. Or, a still easier process is, to throw a few drops of the ferro-cyanide of potassium on a fresh-cut loaf of the bread, when a rose color will be observed at the end of a few minutes, if there is any of the blue-stone present.

The muriate of barytes and ferro-cyanide of potassium can be found at any drug store. It is necessary to keep them where children or others cannot take them through mistake for something else.

3. CHEESE.

This is contaminated with red lead, and produces very serious consequences, when taken into the stomach. I remember a case in which the evil had been caused by the sophistication of the annotto, employed for coloring the cheese. This substance (the annotto) was found to contain red lead, a method of cheating which has lately been confirmed, as will be shown by the following case. A gentle-

man who had occasion to reside for some time in the city, was one night seized with a distressing, an indescribable pain in the region of the abdomen and stomach, accompanied with a feeling of tension which occasioned much restlessness, anxiety, and great aversion to food. He began to fear that inflammation of some internal organ had sat in; but in twenty-four hours the symptoms entirely disappeared. Four days after this he experienced a similar attack; and he then recollected that, having on both occasions arrived from the country late in the afternoon, he had ordered a plate of rich cheese toasted, of which he had partaken heartily; a dish of which he was very fond and often ate of. Everything was so plain that he attributed his suffering to the cheese. The circumstance was mentioned to the lady of the house, who expressed great surprise, as the cheese looked very fine and *rich*, and persuaded him it was not the cheese, and to try it again. He did so, and had another attack; this was considered proof sufficient, and the cheese was tested and found to contain *lead*.

Test.—Take a small piece of the suspected cheese, and put it into one ounce of water, and pass through it a stream of sulphuretted hydrogen gas, previously adding a small quantity, say five drops, of muriatic acid, when you will at once see the fluid turn of a brown or black color, if the smallest quantity of lead is present.

Rule for making Sulphuretted Hydrogen Gas.—Take of sulphuret of antimony, pulverized, ten grains; muriatic acid half an ounce. Put the sulphuret of antimony in a large mouth-vial, that will

hold three or four ounces, and pour the muriatic acid on it. Have a cork well-fitted to the mouth of the vial, through the middle of which a hole must be made to fit a bent or flexible tube. A glass tube is the best, and should be obtained if practicable; one that fits accurately, and of such shape that one end may remain in the cork, and the other pass down through the water. When the acid is poured on the sulphuret of antimony, the gas will soon rise and pass through the tube, down into the water. Care should be taken not to inhale the gas, as it is very unpleasant, and apt to produce headache. The acid should be handled carefully, and not allowed to touch the skin of the operator or others; and when the experiment has been completed, throw away the contents of the vial.

4. CREAM.

The most common adulteration of cream is with rice-meal, arrowroot, and the *brains* of sheep, ox, and, as some assert, even *dogs' brains*. Rice powder is frequently put in by pastry-cooks, in fabricating custards; the arrowroot is used in the dairies. Arrowroot is preferable to rice powder; for when converted with milk into a thick mucilage by gentle ebullition, it imparts to cream previously diluted with milk a consistence and apparent richness that will deceive any one not thinking of such imposition.

The arrowroot powder is mixed up with a small quantity of cold skimmed milk, into a perfect, smooth, uniform mixture; more milk is then added,

and the whole boiled for a few minutes, to effect the solution of the arrowroot. This compound, when perfectly cold, is mixed up with the cream. From 220 to 230 grains (or three teaspoonfuls) of arrowroot are added to one pint of milk, and one part of this solution is mixed with three of cream.

The fraud may be detected by adding to a teaspoonful of the *so-called* cream, a few drops of the tincture of iodine, which instantly produces with it a dark blue or purple color. Genuine cream acquires by this test a faint *yellow* tinge. I will speak again on this subject, when considering milk and ice-cream.

5. COFFEE.

Although coffee is not so often an article in which we are cheated, from the fact that many persons roast and grind their coffee, still, there is no doubt that a majority of the families in cities and small towns prefer buying their coffee ready ground to save trouble, not thinking that the grocer or the manufacturer of coffee would put an article of coffee on them that was not good.

The fraud practised in grinding coffee is, that they put with it such things as peas, beans, sawdust and old coffee-grounds.

To prove to the reader the degree of importance attached to this one article in Europe, I will here give an extract from a law now in force in Great Britain on the subject. Act: "If any burnt, scorched, or roasted peas, beans, or other grain, or vegetable substance, prepared or manufactured for the purpose of being in imitation of, or alleged or

pretended by the possessor or vender thereof, so to be, *shall be made* or kept for sale, or *shall be offered* or *exposed* to sale, or shall be found in the custody or possession of any *dealer* or dealers in, or seller or sellers of *coffee*; or if any burnt, scorched, or roasted peas, beans, or other grain or vegetable substance, or substances, not being coffee, shall be called by the preparer, manufacturer, possessor, or vender thereof, by the name of *English* or *British* coffee, or any other name of coffee, or by the name of *American cocoa*, or *English* or *British* cocoa, or any other name of cocoa, the same respectively shall be forfeited, together with the packages containing the same, and shall and may be seized by any officer or officers of excise; and the person or persons preparing, manufacturing, or selling the same, or having the same in his, her, or their custody or possession, or the dealer or dealers in, or seller or sellers of coffee or cocoa, in whose custody the same shall be found, shall forfeit and lose the sum of one hundred pounds."

Coffee is also adulterated with rye; when they are both burnt or roasted together, it is not so readily noticed as might be expected. The rye can be easily detected by passing an infusion of the suspected article through animal charcoal to deprive it of its color, and then adding to the strained solution some tincture of iodine. A blue color will appear if rye is present.

The same test will answer, if we suspect beans or peas, the tincture of iodine acting on the starch contained in them. The sawdust is hard to detect, and the only rule to follow in regard to this,

is to make a comparison between the feel of the woody fibre and that of coffee. If you put some of it between your teeth, and attempt to chew it, you will observe a creaking sound similar to that produced when small pieces of leather are chewed between the teeth; this sound is not heard when the coffee is *pure*. The best rule to adopt about your coffee, is never to buy it roasted or ground—do this for yourself.

6. CHOCOLATE.

Chocolate is often adulterated with rice flour, wheat flour, the flour of potatoes, beans, and peas; and also with fat, the yolk of eggs, almonds, gum soap, &c. It is often the case that fecula or dreggy materials are mixed with chocolate.

Test.—Take one ounce of the chocolate, one quart of water; boil these together for ten minutes; then strain through paper, and add fifteen or twenty drops of the tincture of iodine. If the chocolate is pure, a yellowish color will be the result; if there is fecula in it, a blue color will be given to the water.

The fraud detailed above is bad enough, but there are others practised, still worse; for instance, sulphuret of mercury and red oxide of lead. They are used to impart to the chocolate a fine red color. This makes the chocolate of a deeper color than the genuine, and also increases its weight. To detect these, powder some of the chocolate, about half an ounce, and add to it one pint of water (cold), and shake well for a few minutes; then let it stand for a short time, and

you will see a deposit at the bottom of the vessel of a brick-red color. If the article of chocolate is good, the deposit will be longer in forming, and of a dull-brown color instead of red.

You may tell if there is any flour, fat, gum, &c. (first spoken of) in the chocolate, by the *rancid smell*. Never buy chocolate that has this rancid and nauseous smell, it is dangerous to use it.

If there is any lead present, it can be detected by the test given when speaking of cheese.

7. COMMON SALT.

It may be thought strange that I should say that as cheap an article as *common salt* is adulterated or impure; nevertheless, I must say a few words on that point. Common salt, unless it is the finest sorts of table salt, is not often *intentionally* rendered impure, but, from carelessness in manufacturing, it often contains chlorides of calcium and magnesia.

The fine table salt frequently contains preparations of lime. To detect these, put some of the salt in strong muriatic acid; if carbonate of lime is present, a brisk effervescence will take place. To judge of the presence of chlorides, immerse some litmus-paper in a solution of the salt, and the color will be destroyed immediately, if the chlorides are present in an undue quantity.

8. FLOUR.

Having said so much on the subject of bread, I do not think it necessary to dwell on the adulteration of flour separately, but will refer the reader

to the remarks on bread, which gives all that is necessary.

9. HOGS' LARD.

A pure article of lard is white, having somewhat the feel of little grains, when rubbed between the fingers. It is without taste, and destitute of odor. Little as you may think of it, it is unfortunately true, that lard is deteriorated by other substances being put into it, which gives it a dark color and rancid smell. Lard *may* become rancid, it is true, even when put up pure; but not if the vessel in which it is kept be tight, and not suffered to remain open, as we too often see them on our streets, in front of a grocery store. Never purchase lard that is rancid; it is unsafe for preparing any article of diet; an instance of which is here subjoined: "Mrs. J. D—— was in the habit of sending her nurse out every day with her infant (nine months old) for exercise in the open air, and gave her generally two pence, to buy some little notion for the child at the baker's, where she was accustomed to pass. The nurse returned one day with the child, and told the lady that it had suddenly taken ill. The child was pale, with cold perspiration, its muscles very much relaxed, and seemed in great agony. A physician was called, who instituted a series of questions, fearing the nurse had accidentally given the child a poisonous substance. The nurse told him that she had bought two small fried puffs for the child, as usual, and that, after eating one of them, he turned pale and sick; became, as she expressed it, '*as limber*

as a rag,' and not knowing what to do, she ran home with him. The physician administered an emetic, which brought off the food just taken, and very soon the child was better. A day or two after this, some more fried puffs were bought and given to the child, not thinking that they had produced the previous illness. The result was the same, and the child came near dying from the effect of inflammation of the stomach and bowels, which followed. The baker was attacked about it, who frankly acknowledged that he had used a barrel of lard recently that was a *little rancid*."

This case is, I think, conclusive enough to put persons on the lookout for "the secret foe." You may easily tell if lard is in the least rancid, by putting into it a piece of litmus-paper, which is immediately turned of a red color.

10. HONEY.

There is scarcely an individual but what can call to mind some bad effects, resulting from the use of honey. From this consideration I am induced to say a few words in relation to it.

Its purity can be told generally, by the following characteristics: If fresh and good, it is in a fluid state; this, by keeping, forms a crystalline mass. In this state, it is a little variable in color, being sometimes white, yellow, or a little darker hue. Sand, potato-starch, wheat flour, &c., are put into honey to make it heavier and improve the color.

Test.—Put half an ounce of honey into one pint of water; when this dissolves, the sand will sink

to the bottom, if there is any present. Add ten drops of the tincture of iodine to one spoonful of honey (which has been dissolved in water); if there is any starch or flour in it, the liquid in it will be turned of a blue color.

11. MEATS.

According to the classification that I have adopted, meats should be considered in this place, but I think it best to defer speaking of the dangers arising from putting up meat in leaden vessels, &c., until I come to the subject of "Lead."

12. MILK.

Milk, of all animal productions, appears to be that which nature intended should constitute to man in general, and children in particular, an agreeable and nutritious food; as it contains all the elements of animal and vegetable life, most beautifully balanced and arranged. It is thus a most perfect diet. Nothing is wanting to it. It contains curd or casein, which is necessary for the development and formation of muscle; butter, for the production of an adequate supply of fat; sugar, to feed the respiration, and thereby add warmth to the body; the phosphates of lime and magnesia, the peroxide of iron, the chlorides of potassium and sodium, with the free soda required to give strength and solidity to the bones, together with the saline particles so essentially necessary for other parts of the body.

It also contains lactic acid or the acid of milk, which chemists inform us is the true acid of the

gastric juice, so requisite for the proper dissolving and assimilating our food in the stomach.

It is therefore obvious that milk should be chemically correct in all its constituents ; that its beneficial effects on the constitution should not be neutralized by *adulteration*. How necessary is it that it should be pure ; otherwise, this wonderful and wise provision of Providence will be a curse rather than a blessing.

Can it be possible for the milk that is sold in large cities to be such as it ought, even if it was not adulterated after coming from the cow, when the cows, from which the milk is taken, are constantly confined in ill-constructed, ill-ventilated, and improperly-drained places—their milk being at the same time formed by such unnatural and improper food as brewers and distillers' grains, and distillers' wash. The first and chief object of food is to form blood, and it is most necessary that this should be of a healthy nature, otherwise it is impossible for the cows to be healthy, or their milk good and wholesome ; their food, then, should contain all the proper ingredients for the formation of good blood, the milk being drained, as it were, from the blood.

Doctor Thompson states that “the nature of milk and blood are parallel, and that to make good milk is obviously producing a similar effect to that of producing good blood, and consequently contributing to build up the body of animals in a healthy and substantial manner. Again, as the blood of cows is identical in composition with that of the human species, it is obvious that the diet of one class of animals must possess a similar composition

to that of the other.”* How especially requisite is milk for children, and for the invalid; and how necessary that it should be pure; for if milk be partaken which has been drawn from diseased cows, or that has been adulterated, or both, it is in turn taken up in the system of those who use it, and many diseases could be easily traced as having been sown in the first instance from this cause.

When we reflect on the many benefits these useful animals were created to confer on mankind, the more we become disgusted with the way they are housed and fed, to supply the large cities with milk; and persons must not think that it is confined to New York, Philadelphia, and Boston, but all cities of any size are cursed with impure milk. Yes, if there are persons mean enough at one place to thus trifle with the health and happiness of a whole community, there are persons at every place where there is an inducement for practising the fraud; and where is the city that the inducement cannot be found by those that seek it? Gain—the thought of obtaining money with little labor, is inducement enough for the unprincipled.

I will now endeavor to give a little insight into the cow-sheds, diseases of the cows, and adulteration of the milk, &c., as found to exist in all cities of any note, but worse in New York than any I know of. Any place, any hovel, cow-keepers seem to think will do for a cow; narrow lanes, confined corners, &c.; and yet they wonder how it is that

* Thompson's Experimental Researches on the Food of Animals.

they lose so many from disease. Can any one that has as much sense as would carry him out of a house on fire, wonder that they should be afflicted with disease, when they are huddled together in a space that does not allow them room to breathe, with their heads often tied up to a wall; and from there not being a sufficient current of air, or ventilation, the carbonic acid gas expired from their lungs, unmixed with a sufficient quantity of pure air, so necessary for the oxidation (vivifying) of the blood, and consequent vitality of the body, is taken into their system?

I have myself visited the worst of the cow-sheds in this city (New York), and have often found the poor brutes in a profuse perspiration, some lying, some standing, all in a horrid mass of filth, with an almost insupportable smell about them, moaning and turning in every direction, as if in great agony and suffering. Placed, as they are, in this situation, their milk is entirely unfit to use, even if the vitiated air had no influence on them, and even if the distillers' wash, and bad food of every kind, did not affect them. Why? for the best of reasons, deduced from physiological facts. Every person must have heard of the bad effects so often produced on an infant, by taking its mother's breast during or immediately after she has been frightened, becoming greatly enraged, receiving an injury, becoming suddenly despondent from hearing bad news, in short, any thing that has a powerful influence on the nervous system.

Now, if this is the case with the human species (and it must be admitted), it must be so with the cow; and what could have a more powerful influ-

ence on the nervous system, than being tied up from day to day with scarcely room to lie down; and when they do, on a wet, filthy floor? And thus lying in that situation, they soon rub off the skin on some part of their body or limbs, and are in a continual state of suffering. Their milk being taken from them in this condition, and peddled out through the city, is given to poor innocent children, who, not thinking of danger, are doomed soon to fall a prey to its baneful influence, which, if it does not result in death at the time, may bring on disease of the stomach and bowels—the little sufferer linger a few weeks of wretched existence, the mother's fond heart to be filled with feelings of deepest sorrow, and at last bid adieu to her affectionate babe.

This perspiration is brought about by the animals inhaling a vitiated atmosphere. This necessarily injures them, exhausts their vigor, and makes them liable to take cold; and when they are milked in these dirty hovels, the milk is always impregnated with the foul air.

What is the result, when cattle are thus confined, and fed with materials that are inimical to their health? The result is, that they are attacked with disease of the lungs; and what disease is brought on by impure air and unwholesome food, under all circumstances?—CONSUMPTION AND TUBERCULOUS DEPOSIT, which runs rapidly into suppuration; or softening abscesses, full of matter are formed; a portion of this matter is taken up and gets into the blood, and through the blood it gets into the milk, and those that drink it are drinking the seeds of their own destruction. It

is for this reason that the physician advises a lady who has this tuberculous or consumptive deposit in her lungs, not to nurse her own child, knowing if it takes its mother's milk, it takes into its own system the seeds of consumption.

If, then, there is any truth in physiology, will not the one that drinks the milk of the *consumptive cow*, take into his system the seeds of consumption, as readily as the one that takes milk from the breast of a consumptive woman?—most certainly he will.

Milk, taken from such cows, when put under a powerful microscope, shows traces of this peculiar matter floating in the fluid, mixed with a bloody-like corruption. This, when taken into the stomach of children, or grown persons, as the case may be, is absorbed and carried through the system, and thus scatters the deadly poison. Milk of this kind has often a very bad smell and taste, to hide which the milkman mixes it with a little milk from the freshest cow in the shed, and adds also, sometimes, sugar of lead, which is a poison of itself, when taken into the system even in this slow and gradual manner. If it were possibly in the power of man to trace the causes of scrofula in one of its forms, making its direful appearance in any particular case, where previously there existed no hereditary taint, it is not at all improbable that it might turn out to be from having, sometime or other, partaken of milk drawn from cows that were diseased, and thus to have become inoculated, as it were, with these terrible diseases.

Worse than this too, we can see that a stimulus would be given for the development of these com-

plaints, where there existed a predisposition to the disease, either by hereditary descent, or otherwise.

I do not pretend to say that every disease which afflicts the cow, thus fed and kept in confinement, is consumption; but I believe the majority of them to be laboring under that fatal complaint; and if any physician will take the trouble to make a dissection of a few cows from one of these cow-houses, he will then be convinced of the correctness of my opinion. "The Parisian Board of Health," who were appointed by the French government to investigate the cause of so much disease amongst the cows of the French capital, came to the conclusion that the disease was *consumption*, and made a report to that effect.

Whether the disease is consumption or not (I do not know what else it could be called), it is evident that it is of a pulmonary character, particularly inflammation of the lungs, &c., which speedily terminate in suppuration or mattering; and as the cow does not throw off much of the matter by coughing, as is the case in the human species, it is again absorbed and gets into the blood, and through the blood into the milk.

What matter they do raise from their lungs is as quickly swallowed, when it gets into the mouth, as is shown by the large lumps that are found in the stomach of some cattle after death, and of which every person has heard in the course of their lives. This is an explanation of the balls, often found in the gastric cavity of cattle, that I have never heard given before, and it is original with me, though others may have advanced the

same views previous to me; if so, I have never heard of it.

The ball is formed as follows: The matter coming up from the lungs, which is swallowed on reaching the mouth, is mixed in the stomach with a portion of hair that they lick from their bodies, and the more thin portions of the matter being absorbed, the earthy substance that they take for want of salt, and the hair, are concreted together, by the glutinous nature of the matter, and is made round by the digestive movements of the stomach.

Cattle also suffer from induration and enlargement of the liver, from being fed on stimulating slops at the distilleries, just as the drunkard has a similar disease from long-continued drinking of spirituous liquors. Under this complaint, the cow yields but scant amount of milk; still, the little milk they do give is added to the *common stock*, thrown into a "big tin," and off goes a man with his *precious article*, to supply his customers with "PURE MILK." And, still more to deteriorate the milk, it is put into large tin vessels, and carried through the streets in the hottest seasons of the year, without even a covering sometimes, to the wagon. With all its impurity and poisonous qualities, these men go throughout the city with it, and it is consumed by an unreflecting public, who, by the proper course, could soon put a stop to its being sold in our midst to slay children by thousands.

We might just as well think of eating the flesh of a sheep that had died of the common disease, "rot," as to drink the milk drawn from unhealthy cows.

To illustrate how necessary it is for the cow, as well as for every other animal, to have space to breathe, I will here give Doctor Thompson's calculations on the amount of oxygen, &c., consumed in twenty-four hours. He says that "six pounds of carbon are expended by a cow daily in the production of animal heat; and as one pound of carbon, when combined with the necessary amount of oxygen to form carbonic acid, gives out as much heat as would melt one hundred and four pounds of ice, it is evident that the quantity of ice capable of being melted by the heat generated by one cow, in one day, would amount to upwards of six hundred and twenty-five pounds. It would consume at the same time the enormous quantity of three hundred and thirty thousand four hundred and twenty-nine cubic inches of oxygen gas, or one hundred and ninety-four and a fourth cubic feet; and as this amounts to one-fifth of the atmospheric air, we find that one cow consuming sixty-one pounds of carbon, for respiratory purposes, would require nine hundred and fifty-six and a half cubic feet of atmospheric air."*

The carbon consumed by the cow is given off from her food, and is required for the purposes of respiration, and is retained for some time in the circulation, undergoing the proper changes for the production of animal heat throughout the body.

I trust it has now been plainly shown how milch cows become diseased, viz., by impure air and improper food. The morbid principle is introduced through the lungs and skin, where it comes in con-

* Thompson on Food of Animals.

tact with the blood; and to show what a vast quantity of vitiated air may be taken into the lungs during twenty-four hours, it is only necessary to state that the lungs may be compared to a sponge, full of a vast number of minute holes or cells; the number is so great that they have been calculated in man to amount to one hundred and seventy-four million.

These cells are furnished with a network of bloodvessels, and are of course much more numerous in cows from the larger surface of their lungs. It is therefore a matter of paramount importance that the atmosphere, whether inhaled by man or beast, should be pure, and free from any admixture of a deleterious nature.

The air of cow-houses is not alone vitiated by the exhalation from the lungs of the cows, but from the improper drainage of their sheds, and from the collections of filth, such as vegetable substances, &c., in a state of decomposition. The poisonous vapors arising from these accumulations are most intolerable.

In nearly all cities, but more so in this than any in America, you will see persons with old carts going round the streets, for the purpose of collecting all the rotten apples, potatoes, peelings of the same, sour bread, and every other thing disgusting to think of, that they can find in the gutters, alleys, &c. These substances, in a state of decomposition, are carried to the cow-houses, mixed up with a little genuine food, and given to the cows that are to supply the public with milk. What a thought this is to one that knows how to appreciate good and healthy milk. But this is not the worst yet;

after the animals are fed and housed in this way for a length of time varying from a few months to two years, they become, as a natural consequence, worn down by disease and ill-treatment—bloated up like the drunkard—they then being of no further use as milch cows, are killed, and the meat sent into market to be consumed by an unconscious and unthinking people. Not content with the frauds practised in dealing out the milk from diseased cows—after they are no longer suited for that purpose, they must then sell the diseased flesh, still further to enhance their own profit, at the expense of the life of their fellow-man.

There is one thing of great importance to the cow, that is neglected by nearly all persons having charge of them in cow-houses. I refer to rubbing or currying of cows; it is scarcely ever attended to; huddled together as they are, in filthy cow-sheds, they go without currying, and, thus neglected, the pores of their skin become filled up, and an effete substance, that nature intended should pass off by this channel, is retained in the system. What then becomes of it? Nature, ever ready to supply a deficiency, sets to work to get rid of this substance by some other outlet; and the mammary glands in this case being better adapted for the purpose than any other part of the body, it is carried off along with the milk, and consumed by those that buy it, to use alone, or in coffee and tea, or made into *milk punch*, custards, &c.

This effete substance being taken along with the milk into the stomach, is absorbed and deposited in the human system, every day that a drop of it is used. This substance, so inimical to the healthy

functions in the system, soon sets up a permanent predisposition to the development of disease, and the slightest cause is sufficient to call it into action. Still, with all these astounding facts before the public, they seem as yet to have let it pass unheeded; but I think now that they will be aroused to a sense of their danger, and reflect seriously on the means to be made use of for putting a stop to the murderous traffic.

Cows are fed (besides the articles before spoken of) on brewers and distillers' grains and distillers' wash; in fact, it is considered their staple food. Cow-keepers fancy that it produces a quantity of milk; but in this I think they are mistaken; and even though it should, it is at the expense of the health of the cow, and the quality of her milk—for it is of a very watery character, and of a most corrupt nature, as the blood from which it is secreted has been stimulated to an undue and inflammatory—a feverish condition; and nothing can be given off from the blood, while in this condition, that is of a healthy nature.

It has been ascertained that cows, fed in this way, soon have enlarged and hardened or indurated livers, and, from this organ not being able duly to perform its functions, they are frequently subject to the “yellows,” or jaundice. When a cow becomes thus affected the secretion of milk is quite limited, and what is yielded is of a yellowish and stringy nature, their udders becoming hardened and suppurated; the milk is changed into a fluid resembling matter, and smells most offensively.

When we reflect on the variety of diseases in which milk diet is a valuable article, how import-

ant it is for medical men to know what sort of an article they are ordering for their patients.

He may order a milk diet and go off, not thinking of the importance of it, and be summoned again in a few hours; and when he arrives, finds his little patient much worse, perhaps dead; the mother greets him with, "Doctor, what did you do to my child? you have killed it." What must be that physician's feelings at that moment. All this could have been avoided by prohibiting the use of the milk, which is so impure.

When I am called to attend children in the summer months, suffering with cholera infantum, the first thing I do is to ask if the child uses milk; the reply generally is, that it does; I then tell the parents that they must not give the child any more *poisonous milk*, at which they seem astonished, until I tell them a little of the bad quality of milk in this city. They quit giving the child the milk, and in a few days, *it is well*, having taken nothing but some allspice tea, nutmeg, and loaf sugar and bread.

CASE I.—Was called early one morning to see a little boy, who was vomiting incessantly. Found him greatly prostrated, bathed in a cold clammy perspiration, a fluttering and feeble pulse, retching and vomiting every few minutes, and cold extremities. Was informed that the child had drunk half a pint of milk a few minutes before, *fresh from the milkman*, and was soon after taken with the symptoms above described. The case was very plain—the milk had *poisoned* the child. By giving powerful medicines the child's life was saved, but it lingered for more than four weeks in a critical condition, all caused from the milk.

CASE II.—Was called, to go in haste, to see a child thought to be poisoned. On arriving, found the child lying on its mother's lap, its eyes closed, weak and feeble pulse, hard breathing, and in a profound stupor. This case was inquired into; the child had taken milk, also; and soon after taking it, became drowsy, and could not be aroused. All remedies failed to do it any good, and it died twenty-six hours after.

CASE III.—Was requested to see a child that had been under the care of one or two physicians for three weeks. On reaching the house and making inquiry into the case, received the following statement: "The child has been affected with chronic diarrhœa, for more than four weeks, all remedies having no effect on it."

"Madam, has your child been allowed the use of milk during its sickness?"

"Yes, Doctor, boiled milk and arrowroot has been its principal diet."

This explained the case to me clearly. I told the parents not to allow the child any more milk; ordered some mild astringent and tonic, bathing once a day, and in five or six days the little child was able to run about the room.

Other cases could be given, but the above I consider sufficient.

Having spoken of the diseased condition of the cows, &c., I will now call your attention for a moment to the substances with which milk is adulterated, after being taken from the cow, and in doing so, I fear that many will think I have exaggerated, but such is not the case; I have no cause for doing so.

The substances usually employed for the purpose of adulterating milk, are water, flour, starch, chalk, the BRAINS of *sheep, calves, oxen, hogs*, and, as I have been credibly informed, the BRAINS also of DOGS and HORSES, when the others cannot be obtained, and these latter are to be had. There is a regular market for the heads of all these animals, but no one ever seems to think what is done with them. If you ask a person that takes HEADS to certain men to sell, what is done with them, he is as apt to tell you soap-fat, as any thing else. *How probable it seems*, but don't believe a word of it; the heads occupy a certain space in the "*big tin*," rest assured of it.

I am well aware that there are those who will deny this; pay no attention to them, but look out for yourself, and see if they are not partners of a cow-keeper in the suburbs of the city. I hope you will bear with me for one moment, while I offer some reasons for what I have stated above.

In the first place, all will admit that the milk sold in cities is very poor, very impure. Well, if persons are mean enough, that are engaged in selling milk, to put into it such things as flour, chalk, starch, and things of that kind, will they not be mean enough to put into it sheeps' brains and calves' brains? (Admitted.) If they are unprincipled enough to put in sheep and calf brains, will they not be as much so as will cause them to put in the brains of the dog, horse, ox, or anything else they can lay hands on. I leave it to your own good reason to decide.

If you are convinced that a man will steal one dollar, you are convinced that he will steal one

thousand, if he can get it. If a man will engage in a traffic that he knows is daily slaying its hundreds of human lives, in the name of humanity, in the name of God, what is there he will not do?

I trust now, that you can no longer doubt the truth of what has been set forth in regard to the adulteration of milk, and here let me say another word before proceeding to give the tests for the presence of the adulterations. Some persons will say that "poor people do not get good milk, but the better classes have a good article." What a sad mistake, and more than this; in most cities there are families who keep their own cows, and thus think to obtain good, pure milk. They too are mistaken very often, for those into whose care the cows are put have learned that, by adding water, starch, a little sugar, and such things, they can make milk in abundance from one or two cows, and thus sell a few shillings worth every day. It is easy to see the inducement, the profit arising from selling the milk amounts to more than their wages.

They keep practising their hand until they get about as smart as the milkmen—watch for yourself and be convinced.

As the question may be asked, "how do they make brains have the appearance of milk," I will give the process. They take the brains and rub them up with their hands (which are none of the cleanest), having previously put the brains in warm water. The lighter and more stringy portions are skimmed off generally, but if they are much hurried they let it remain, thinking that their customers will take it for cream, or that it is

none of their business—enough for them to buy, pay for, and use it. I have, at different times, myself seen these stringy portions floating in my cup of coffee or tea, but made an excuse not to thus devour the poor animal's brain, by telling the landlady, "I dont use milk in my tea, if you *please*." I was then living in a boarding-house, bear in mind.

On one occasion, I took the trouble to examine the substance, and found it to be "*one of the delicate membranes of the brain*," since which time I have not used any milk, unless I am in the country among acquaintances. "Go and do likewise," abandon the use of the poison, and soon the milkman may split his throat hallooing "pure milk," but no go—false alarm.

Another imposition palmed off on the public is, that every milkman "brings *his* milk from a distance in the country." This he tells to his customers to make them think they are getting good milk; its all stuff, don't believe a word of it. You can't find one family in this city (New York) but what "*gets milk fresh from the country*," and yet there are hundreds of cows kept in the city; yes, in one place you can find hundreds huddled together on a spot of ground not one hundred yards square.

There are many that bring milk from a short distance in the country, but what better is the milk by that? The cows are fed the same way and housed the same way, in some degree. And they are not groomed any more than they are in the city; the men, too, in the country, are as likely to put all these adulterations in the milk before taking it to the city, as those are that live in the city;

if any difference, I would rather risk milk that comes from the city, as those living in the country do not consider themselves under the restraint they would in a city, but can come in and go out at pleasure.

But I did not quite finish a description of the process for making milk from brains. After rubbing the brains up in the way spoken of, for a short time, a white, milky-looking emulsion is the result. This is stirred up with the quantity of water which is intended to be added to the milk. The brains materially improve the *appearance* of the milk, giving it a *rich* tint.

Cream is more extensively adulterated than milk with brains, they having a color nearer that of cream.

SCENE AT A COW-HOUSE.—Imagine (and not only *imagine* but believe), for it happened not long since in this city, a man near by where two of the milkmen, partners, are talking.

Tom.—"I say, Jack, Mrs. Goodlin wants half a gallon of cream; have you got any made?" Not quite certain whether the name was Goodlin or not.

Jack.—"No, Tom, none called for to-day, and I didn't make any; I can soon make some, though, if you want it."

Tom.—"How many long-noses (*sheeps' heads*), have you got?"

Jack.—"Three, and had to pay eighteen pence for them, and arrowroot is some higher, too."

Tom.—"Well, go and make the cream, while I draw water to fill up the big tin. I believe old Biddy is a dying sure enough, but tell Bill to milk her once more any how. (Exit Tom with a big bucket, going after water.)

I hope my readers will excuse this varying from the subject, but it was so good I could not refrain from giving it.

One of the most certain and active poisons put into milk is, as I before said, *sugar of lead*. The sugar of lead when put into water, makes it have a milky appearance, by forming a carbonate of lead, which is held in solution. The test for the lead is sulphuretted hydrogen. This is to be passed through a small quantity of the milk, say half a pint, and immediately the fluid will be turned of a dark brown or black color, if there is any lead present. The same rules are to be observed in this instance, as in every other where sulphuretted hydrogen gas is made use of as a test. For a full description of its application, and also for the rule in making it, see article Cheese, previously spoken of.

It would be unnecessary to repeat the process in this place, as it is in every respect the same in both cases.

Salt is sometimes put into milk to impart a taste which will cover that of something else not so pleasant. If they happen to put in so much water as to make the thinness of the milk too apparent, they add a little flour or whiting to make it thick again.

Another imposition is that of taking the first milk of the cow after calving, instead of allowing the calves to have it (which are removed from the mother when not more than two days old, killed, and sent into market as veal), to whom it justly belongs, and is not fit to use by any human being.

Many of the milkmen carry their milk in tin ves-

sels, unprotected from the heat of the sun, which in summer and fall is such as to cause the milk to turn sour very soon. This could be remedied by surrounding the tin vessels with a wet cloth or ice. Should the milk become sour before they go their rounds, they soon neutralize it by adding some carbonate of soda.

Having spoken at some length of the diseased milch cow, the adulterations, &c., I will now give the tests for most of the substances mixed with milk. To detect flour or starch in milk, take one ounce of the suspected article and drop into it gradually twenty drops of the tincture of iodine. If either of these substances are present, the milk will become of a blue color.

Chalk or plaster of Paris can be detected as follows: Take half a teacupful of the milk, let it stand for two hours; then pour off the milk slowly, and you will see the chalk at the bottom. To prove that it is chalk, add a large quantity of water, near half a pint, and then pour on it some sulphuric acid (oil vitriol), and a precipitate of the sulphate of lime is the result.

When there is much water in milk it is of a bluish color instead of pure white.

Unfortunately, it has hitherto been a difficult matter to tell when the brains of animals had been made use of in fabricating milk, except by the microscope, in the absence of which, I present you a test much more simple and equally as good: Take one quart of the suspected milk, put it into an open vessel, and set it where it will keep a little warm, and let it remain for thirty-six or forty-eight hours; then take it and smell of it and you

can at once detect the peculiar odor of decomposing animal substance. Some will say "that any milk will smell bad in that time under the circumstances." It will smell *sour*, but will not have the peculiar smell of *decomposing animal matter*, unless it is present—it is impossible. This is the first time any simple and efficient test has been given to detect the brains in milk, which I claim as first given by me. Before closing this article, it may not be amiss to say a few words about how the evil could be remedied. The attention that this subject requires should be paid to it; it is of grave and paramount importance. The following is taken from the *Veterinary Record* for April, 1848, and it quotes from a New York paper of that year. "There is on Long Island, near Brooklyn, several manufactories of milk, the process of which should be known. One of these dairies covers a space of six hundred feet front by three hundred feet deep, carefully fenced in so as to be as private as possible; the business of the people being to drink the milk, not to know how it is made; in which inclosure four hundred cows are kept the whole year round. These cows are fed on the refuse slops of whiskey-distillers, and it is given to them warm. Such is the fondness of cows for this vile compound, that after having fed upon it for a week or more, their appetites become so depraved that they will take no other food. '*How like unto man.*' The result is, their milk-producing organs are stimulated to a wonderful degree; they yield enormously but soon become *diseased*; their gums ulcerate, their teeth fall out, and their breath becomes fetid. Though thus diseased, they do not fall away in flesh, but on the

contrary, puff up and bloat, an appearance of great fatness; their joints become stiff that they cannot with ease lie down, and rarely or never come out alive.

“Bad as this is, their milk is afterwards mixed with molasses, water, and whiting, and then sold to the public of New York as pure milk. It is of course very injurious to children, who use it in much greater quantities than adults.”

Let the authorities of every city at once take steps to put a stop to this high-handed murder. No sooner than a man has taken the life of one of his fellow-beings in the heat of passion, than he is arraigned before a bar of justice, and made to answer the demands of the law; whereas, there are those that can deal out a deadly poison to thousands, and remain in their glory and go unmolested. Such things should not be tolerated in this land of boasted freedom.

In some parts of Europe, the government has officers for the express purpose of looking after the milk trade, and no milk is allowed to enter the cities without first being inspected by these officers, and any unhealthy cow-houses are torn down as a public nuisance. Any person found guilty of adulterating milk in any way, is immediately prosecuted. No milk taken from diseased or unhealthy cows is allowed to be sold, but the cows thus diseased are killed, the hides, horns, &c., are sold and the flesh destroyed to prevent its being sold as food.

If some such law as this was put in force in this country, and every milkman found guilty of violating it was prosecuted, the time would soon come

when we would have pure milk in cities as well as in the country.

It is indeed a lamentable thought that such things are allowed in an enlightened community, and if they are to continue, what will they lead to? Soon every article of diet and drink will share the same fate; indeed, it is the case now to an alarming extent, and it is high time that the public were on the lookout; when once informed on this subject, they will be utterly astonished. If any one thinks I have exaggerated in my description, let him look for himself, and unless he closes his eyes to every sight before him, he will be convinced—he will come to the same conclusion that I have done.

In conclusion, let me say that I hope that what has been said will arouse the public on this important subject, and if the city authorities do not take some steps to put a stop to this every-day murder, let the public make a resolve that they will not allow the poison to come into their houses, or be used in any way, and by so doing save from destruction those that are near and dear to our hearts, and no longer sow the seeds of destruction in the system of those that otherwise might ever remain free from the fatal disease.

I am much gratified to see that a lively interest has been taken in this matter by one of the public journals of this city, and I humbly trust that every journal throughout the country will take as much interest as this has done, and use their influence in putting a stop to such flagrant imposition on the public.

The journal to which I refer is *The New York*

Herald, and the editor deserves great credit for what he has done in the matter, which he has treated of at some length. The following is an extract from the *Herald* of July, 1851. After giving the weekly mortality in the city of New York (in which three hundred and twenty-one children under five years of age died), he says: "Now in what manner have the laws of nature been violated—for it is only by assuming that they have been violated, that we can account for this dreadful loss of life. According to the investigation which has been given to the subject—according to the concurrent testimony of chemists and medical men—according to observation and reason—according to experiments made at different times and according to the dictates of philosophy, nine-tenths of the deaths which occur at this season of the year, among our infantile population are produced by that abominable, noisome, nauseating, and health-destroying mixture known as distillery milk. It has been demonstrated by the Academy of Medicine that this vile stuff acts as an active poison on the delicate systems of children * * * * *."

I have been very greatly indebted to Dr. H. Hodson Rugg (corresponding member of the National Vaccine establishment, &c.), for the most useful information on this important subject. And now let me fondly hope that what has been said in relation to milk will not have been in vain, but be the means of doing much good to my fellow-beings.

13. PICKLES.

Very many vegetable substances are now preserved in the condition termed pickle, by the an-

tiseptic power of vinegar, whose sale very frequently depends much upon a fine, lively green color; and the consumption of which, by sea-faring people in particular is prodigious; they are often intentionally colored by means of some preparation of *copper*.

Many fatal consequences are known to have ensued from the use of these stimulants of the palate, to which the fresh and pleasing hue has been imparted, according to the deadly formula laid down in some modern cook-books, such as boiling the pickles with pieces of copper, or suffering them to stand for a considerable time in brass vessels.

I will here give the particulars of a case, proving the poisonous qualities of pickles impregnated with copper: "A young lady who was very fond of pickles, ate two or three cucumber pickles on Sunday before dinner. She soon complained of pain in the region of the stomach which was almost intolerable. On Thursday morning following, she was taken with vomiting, which continued until Saturday, eleven o'clock A. M. The vomiting now ceased, and her stomach became greatly distended, which continued until Monday evening, (nine days after eating the pickles), when she died. On examination after death, one or two perforations were found in the stomach, caused, no doubt, from the *copper*.

Test for copper in pickles.—Cut some pieces of the pickle, and pour on it some liquid ammonia, diluted with an equal bulk of water; if there is the smallest quantity of copper present, the ammonia assumes a *blue color*.

14. SAGO.

The sago that is mostly used at the present day is called pearl sago, which is usually found in little pearly grains. They do not dissolve in water, but when put into warm or hot water, they swell up and become translucent, and makes a soft mucilaginous mass, very suitable for sick persons that cannot bear an irritating diet.

The common starch made of potatoes is frequently sold to persons unacquainted with sago, as good pearl sago. It is difficult to detect the cheat, but you may tell a good article of sago by the grainy feel it has, and by its not being lumpy, as is the case with potato starch.

15. TEA.

How often is it the case, that sugar is made use of for the purpose of improving the taste of various articles of food! It must be admitted that it is very palatable and very pleasant to use it, but at the same time it is an unfortunate thing that it is used so often and so plentifully in tea, for by putting the sugar with what you think is tea, you are only adding sugar to cover the taste of *elder leaves*, *ash leaves*, and many others equally as disgusting to think of.

In proof of this statement, it is only necessary to refer to a case of prosecution recently given in one of the London newspapers. It was in substance as follows: "On — day of —, E. R. — was arrested for fabricating and manufacturing large quantities of spurious tea, i.e. mix-

ing with the genuine tea leaves those of the *ash*, *elder*, *sloe*, and some others. It was proved that the said E. R—— had large quantities of this spurious tea in his possession, and had sold the same as genuine, and from which cause several persons were made sick by using said spurious tea." The verdict returned was "that the said E. R—— be fined the sum of 2000 pounds, and all such tea as was found in his possession should be destroyed, and in default of the payment of the same, shall be committed to the House of Correction for the period of not more than twelve nor less than six months." In another case of prosecution for a like offence, one witness made the following statement: "I am John K——, have been in the employ of J. M——, a grocer, in Goldstone Street, for two years. I have seen the leaves of the ash, white thorn, and elder mixed with tea leaves. The process is this: To make the leaves have the appearance of tea, they are first boiled, then baked upon an iron plate, and when dry, rubbed with the hand in order to produce that curl which the genuine tea has. The color is given them generally by logwood; this is to make the black tea; to make the green tea, after the leaves are dried they are laid on sheets of copper, where they receive their color from an article called *Dutch pink*." Thus we see what is used when we think we are taking tea, and this is not yet the worse imposition, for there is one that is *positively poisonous*; I allude to the "*verdigris*" which is added to the Dutch pink, to produce the fine green bloom, observable in the finest qualities of China tea. So it is a notable fact that, when

we imagine we are taking a pleasant and nutritious beverage, we are taking a slow poison. I can bring a host of the most respectable physicians that will say that in the course of their practice they have often been called to persons suddenly attacked, and on reaching the patient they were told that they were perfectly well until tea, and a few minutes after rising from the table, they were seized with great pain in the stomach, nausea, retching and vomiting, followed by great faintness and cold perspiration. In such cases, though the family would attribute the sudden illness to this and that cause, and the physician would not be suspecting any danger from the use of the tea, there can be no doubt that the real cause was *poisonous* tea. I recollect a case that goes far to prove this, which was related by a physician living in one of the Southern States. "I was stopping a short time at a little village, and one night about nine o'clock the place was one scene of excitement and confusion. On inquiry, I learned that a physician had been sent for to attend a family that was said to be *poisoned*. Having some little curiosity to see the case, I rode out with the attending physician. When we arrived, we learned that after tea several members of the family were taken with symptoms of being poisoned, and only those that drank tea that evening were sick. The remaining portion of the tea was examined, and we detected the '*verdigris*' in it."

Mode of ascertaining the adulterations in tea.—To ascertain whether other leaves have been substituted for the genuine tea leaves, proceed as follows: Take some few of the leaves, macerate them

in water for a short time, and then spread them out between pieces of paper, and press until dry.

If the leaves correspond with the illustration given in figure No. 1, they are genuine tea leaves, if not it is a cheat of some kind, and you may depend on it. The shape you will see is slender and narrow, the edges deep, serrated, and their ends acutely pointed.

In figure No. 2, is represented the spurious tea. The leaves you can see are more rounded and also more obtusely pointed; and the serrations on the edges are not so deep. Some may say that tea leaves differ in size, &c., according to the quality. The leaves of some specimens may be larger than others, but their shape is all the same, for all the different kinds of tea imported from China are the produce of the same species of plant, and the difference between the Green, Souchong, and the Black Tea, depends chiefly upon the climate, soil, culture, age of the plant, and mode of drying.

If you take *spurious* black tea, and moisten it slightly, then rub on a sheet of white paper, it produces immediately a bluish-black stain; and makes, when thrown into cold water, a tincture of like color, which becomes reddened by putting into it a drop or two of oil of vitriol. If the tea is genuine, when thrown into cold soft water, it produces an amber color, and this *does not* become reddened by the oil of vitriol.

To detect the preparation of copper take a small quantity of tea, put into a vial and add some liquor ammonia (spirits hartshorn), and shake them together; if the copper is present you will

see the mixture turn of a sapphire-blue tinge. A little water should be added to the ammonia before putting it in the vial. Green tea, colored by carbonate of copper, when thrown into water that has had sulphuretted hydrogen passed through it, becomes of a black color. Genuine tea undergoes no such change. More minute tests could be given, but the above are considered sufficient for any person to tell when they are using a genuine article of tea, or one that can be bought for a less price, and impregnated with poisonous substances, and if persons will knowingly and willingly take a slow poison, they must abide the consequences.

16. TAPIOCA.

The tapioca is adulterated very often, but as the detection of the ingredients used is difficult, it is useless occupying space in speaking longer on the subject. For the detection of the adulteration, &c., in this article, the reader is referred to the remarks under Article 14, Class I.

CLASS II.

SPIRITUOUS AND MALT LIQUORS, &c.

1. Beer.—2. Brandy.—3. Gin.—4. Porter.—5. Rum.—6. Wines.—7. Whiskey.

1. BEER.

THIS favorite beverage is greatly adulterated, and that too with substances detrimental to health in the extreme. The brewer should not use any ingredients in his brewings except malt and hops; but it too often happens that those who suppose they are drinking beer made of these ingredients only, are drinking a compound made up in the most horrid manner. And it is not the poor alone that are thus deceived, but it is all classes of society that are exposed to the nefarious fraud.

Beer is not only adulterated with unwholesome ingredients, by retail grocers, but the brewers are in the habit of mixing up substances in their enchanting cauldrons that are revolting to think of. To illustrate to what extent this sophistication, and in what manner it has been carried on in breweries and other places, I will give an extract from the British laws on this subject, viz.: "No druggist, vender of or dealer in drugs, or chemist, or other

person shall sell or deliver to any licensed brewer, dealer in, or retailer of beer, knowing him to be such, or shall sell or deliver to any person on account of, or in trust for any such brewer, dealer or retailer, any liquor called by the name of or sold as coloring, from whatever material the same may be made, or any material or preparation other than unground brown malt, for darkening the color of worts or beer, or any liquor or preparation made use of for darkening the color of worts or beer, or any molasses, honey, vitriol, quassia, cocculus indicus, grains of paradise, guinea pepper, or opium, or any extract or preparation to be used in worts or beer for or as a substitute for malt or hops; and if any druggist shall offend, in any of these particulars, such liquor, preparation, molasses, &c., shall be forfeited, and may be seized by any officer of excise, and the person so offending shall, for each offence, forfeit £500."

This is given merely to put people in this country to thinking. It must be seen from this that such has been the poisonous adulterations in this article in England, that the public could not consider themselves safe, and petitioned for the law, an extract of which is given above, and which law now stands in full force. If persons have the audacity, under the crown, to do such diabolical deeds, what will they not do in this land of boasted liberty, where they know the laws are not so stringent on this point.

Although this is a land of freedom, and thank God that it is, we should not allow those that manufacture such articles as are for public consumption,

to make them poisonous, to deal the weapons of disease and death amongst thousands. One adulteration of beer consists in adding quassia, which gives the beer a bitter taste, and this is a substitute for hops; but hops possess a more agreeable aromatic flavor, and there is reason also to believe that they render beer less liable to spoil by keeping; a property which does not belong to quassia. It requires but little discrimination to distinguish very clearly the peculiar bitterness of quassia in adulterated beer. Vast quantities of the shavings of this wood are sold in a half torrifed and ground state to disguise its obvious character; and to prevent its being recognized among the waste material of the brewers.

Wormwood has likewise been used by fraudulent brewers. Beer made bitter by quassia never keeps well unless it be stored in a place where the temperature of the surrounding atmosphere is much higher than the apartment where it is kept, and this is not so easy to accomplish in large establishments.

The use of boiling the worts of beer with hops is partly to communicate a peculiar aromatic flavor which the hop contains, partly to cover the sweetness of undecomposed saccharine matter, and also to separate by virtue of the gallic acid and tannin it contains, a portion of a peculiar vegetable mucilage, somewhat resembling gluten, which is still diffused through the beer.

The compound thus made separates into small flakes like those of curdled soap; and by this means the beer is not so liable to spoil, for nothing contributes to the conversion of beer, or any other vinous fluid, into vinegar more than mucilage.

Hence, also, all full-bodied and clammy ales, abounding in mucilage, and which are generally ill-fermented, do not keep as perfect ale ought to do.

Quassia is, therefore, unfit as a substitute for hops, and even some hops are preferable to others; for nitrate of silver and acetate of lead produce a more abundant precipitate from an infusion of one sample than another; the difference may consist in the time at which the hops are gathered from the vine. Capsicum (Cayenne pepper), and grains of Paradise, two very acrid substances, are made use of to give a pungent taste to weak, insipid beer. From the foregoing facts, it must be obvious that the adulteration of ale is not a matter of imagination.

The fraudulent grocer has a process by which he can make new beer appear old, and thus more readily sell it. The process consists in an admixture of sulphuric acid (oil vitriol) with the beer. An imitation of the age of eighteen months is thus produced in an instant. This is technically called "*to bring beer forward*," or "*make it hard*."

It can be seen at a glance that the practice is a bad one. The genuine, old, or entire beer, of the honest brewer, is quite a different compound; it has a rich, generous, full-bodied taste, without being acid, and having a vinous odor; but it may, perhaps, not be generally known that this kind of beer always affords less proportion of alcohol than is produced from mild beer. If, on the other hand, the brewer has too large a stock of old beer on his hands, recourse is had to an opposite practice of converting stale, half-spoiled, or sour beer into mild

beer by the simple admixture of an alkali or alkaline earth.

Oyster-shell powder and subcarbonate of potash or soda are usually employed. These substances neutralize the excess of acid, and render sour beer somewhat palatable. These sophistications may be considered at first as minor crimes practised by fraudulent brewers, when compared with other methods employed by them, which renders beer noxious to health by the addition of substances absolutely injurious. To increase the intoxicating quality of beer, the deleterious vegetable substance, called *cocculus indicus*, and the extract of this poisonous berry, technically called "*black extract*," or by some "*hard mullum*," are employed.

Opium, tobacco, nux vomica, and extract of poppies, have also been used.

That a minute portion of an unwholesome ingredient taken daily in beer, cannot fail to be productive of mischief, admits of no doubt; and there is reason to believe that a small quantity of narcotic substance (and *cocculus indicus* is a powerful narcotic), daily taken into the stomach, together with an intoxicating liquor, is more certain in its effects than it would be without the liquor.

The effects may be gradual; and a strong constitution, especially if it be assisted with constant and hard labor, may counteract the destructive consequences perhaps for many years, but it never fails to show its baneful effects at last. Let me cite one circumstance in proof of this: It is a well-established fact that porter drinkers and beer drinkers are very liable to apoplexy and palsy; and here we have an explanation of it—the spirits

and the narcotic substance, keeping a constant afflux of blood to the head, produce the disease. Salt is also added to beer to increase the thirst of the consumers. Sulphate of iron (green vitriol), is added to beer sometimes to give it the property of frothing.

Detection of Frauds in Beer.—The detection of the adulterations of beer with deleterious vegetable substances, unfortunately is, as yet, beyond the reach of chemical science. Some persons may ask, “How then is it known they are put into it?” By the materials being found in their possession, and they could give no excuse why they had them, and by the undue stupefying effects of the beer.

Sulphate of iron may be detected by evaporating the beer to dryness, and burning away the vegetable matter obtained, by the action of chlorate of potash in a red-hot crucible.

The sulphate of iron will be left behind among the residue in the crucible, which, when dissolved in water, may be assayed for the constituent parts of the salt, namely, iron and sulphuric acid; for the former, by tincture of galls, ammonia, and prussiate of potash; and for the latter, by muriate of barytes.

If beer has been made hard by sulphuric acid, it affords a white precipitate (sulphate of barytes), by dropping into it a solution of acetate or muriate of barytes; and this precipitate, when collected by straining the mass, and after having been dried and heated red-hot for a few minutes in a platina crucible, does not disappear by the addition of nitric or muriatic acid. I know this is a test only applicable for professional men, and am

sorry that more accurate tests could not be given, and more so about the narcotic materials which should be detected, if possible. Should a second edition of this work be called for, I hope to be able to give some test for them and many others that are now obscure. Untiring researches after truth seldom fail to bring forth its reward, and laboring under this conviction, I will use my best efforts to detect fraud wherever I can.

2. BRANDY.

Brandy is adulterated with many articles. The brownish-yellow color, concerning which many are mistaken, thinking it is a color given to it by some dyewood or burnt sugar, is nothing more than the color acquired by being kept in vessels of oak-wood.

Some retail dealers, indeed not a few, sell under the name of brandy, an article made up of alcohol diluted with water, and colored with something to give it the appearance of being "*old French*." The taste of this spurious brandy is different from that of the genuine article, having a somewhat metallic taste, and on adding a little per-sulphate of iron, the color does not change, as it does when pure, to a black, inky color.

Copper is often found in brandy, owing to the vessels in which it was distilled being made of that metal. It is easy enough to detect this by the following process: "Take some of the brandy and pour into a glass; then take a smooth, bright piece of iron of any kind and immerse into it, and immediately a copper color will be observed on the iron, if there is any copper present.

Perhaps one of the worst frauds practised in brandy, as regards its influence on the human system, is the acetate of lead, which is added to the brandy for the purpose of clarifying it. Its presence can be detected by passing a stream of sulphuretted hydrogen gas through it, when immediately a black precipitate of the sulphuret of lead is the result.

Grains of Paradise and Guinea pepper are put into weak brandy to give it the taste of a strong brandy. The flavor which characterizes the *French brandy*, and which is owing to a small portion of a peculiar essential oil contained in it, is imitated by distilling British molasses spirit over wine lees; but this spirit, prior to being distilled over wine lees, is previously deprived in part of its peculiar disagreeable flavor by rectification over fresh-burnt charcoal and quicklime.

Oak sawdust and spirituous tincture of raisin-stones are likewise used to impart to brandy a ripe taste, resembling brandy long kept in oaken vessels, and a somewhat oily consistence, so as to form a durable froth at its surface, when strongly agitated in a vial. Many other frauds could be enumerated, but I think it useless, as the means of detecting them could not be appreciated by those unacquainted with the delicate operations in chemistry.

3. GIN.

Of this much could be said, but it would be of more interest to the distillers than any one else, and as they generally "know how to manage to a

good advantage," it will not be necessary for me to instruct them further on the subject.

4. PORTER.

All that relates to the adulterations in porter, can be found under the head of "Beer," the two being prepared in nearly the same manner.

5. RUM.

There are many foreign substances put into rum, such as oak sawdust, spirituous tincture of raisin-stones, &c., to give it the ripe taste of old rum, but they are difficult to detect by simple means.

6. WINES.

There are few of those commodities which are the objects of commerce that are adulterated to a greater extent than wine. Every person that is conversant with the subject is aware that wine is very inferior in this country when compared with the wine in France and some other countries.

The adulterations of wine consist in part of the following:—

Alum is added to young and meagre red wines for the purpose of brightening their color. Brazil wood, or the husks of elder-berries are employed to impart a deep, rich, purple tint to red port of a pale faint color; gypsum is used to render cloudy white wines transparent; additional astringency is imparted to immature red wines by means of oak-wood sawdust and the husks of filberts; a mixture of spoiled foreign and home-made wines is

converted into the wretched compound frequently sold by the name of "*genuine old Port.*"

Many expedients are resorted to for the purpose of communicating particular flavors to insipid wines. Thus a peculiar flavor is produced by bitter almonds; factitious port wine is flavored with a tincture drawn from the seed of raisins; and the ingredients employed to form the *bouquet* of high-flavored wines, are sweet-briar, orris-root, cherry laurel water, and elder-flowers.

The flavoring ingredients used by manufacturers, may all be purchased by those dealers in wine who are initiated in the *mysteries* of the trade; and even a small receipt book for preparing them, and the whole mystery of *managing* all sorts of wines, is kept for sale amongst them.

There are persons in most large cities that are daily employed in the transmutation of liquors, and by the power of drugs and incantations, can raise in our streets the choicest products of the hills and valleys of France. They can squeeze Bordeaux out of the sloe, and draw champagne from an apple.

The particular and separate department in this factitious wine trade, called *crusting*, consists in lining the interior surface of empty wine bottles in part, with a red crust of a super-tartrate of potash, by suffering a saturated hot solution of this salt, colored red with a decoction of Brazil wood, to crystallize within them; and after this simulation of maturity is perfected, they are filled with the compound called port wine. Other artisans are regularly employed in staining the lower extremities of bottle corks with a fine red color, to

appear, on being drawn, as if they had been long in contact with the wine.

The preparation of an astringent extract, to produce from spoiled home-made wine a genuine old port, by mere admixture; or impart to weak wine a rough, austere taste, a fine color and a peculiar flavor, forms one branch of the business of particular wine-dealers; while the mellowing and restoring of spoiled white wines is the occupation of men who are called "*refiners of wine.*"

I have stated that a crystalline crust is formed on the interior surface of bottles, for the purpose of misleading the untaught into a belief that the wine contained in them is of a certain age. A corresponding operation is performed on the wooden cask; the whole interior of which is stained artificially with a crystalline crust of super-tartrate of potash, artfully affixed in a manner precisely similar to that before stated.

Thus the wine merchant, after bottling off a pipe of wine, is enabled to impose on the understanding of his customers, by taking to pieces the cask, and exhibiting the beautiful dark-colored and fine crystalline crust, as an indubitable proof of the age of the wine; a practice by no means uncommon to flatter the vanity of those who pride themselves in their acute discrimination of wines.

These, with many other sophistications, which have long been practised with impunity, are considered as legitimate by those who pride themselves for their skill in the art of managing, or according to the familiar phrase, "*doctoring wines.*" They allege, in exculpation of them, that though decep-

tive they are harmless ; but if we could admit this as a palliation, yet they form only one department of an art which includes other processes of a tendency absolutely *criminal*.

Several well-authenticated facts have convinced me that the adulteration of wine with substances deleterious to health, is practised oftener than is, perhaps, suspected; and it would be easy to give some instances of very serious effects having arisen from wines contaminated with poisonous substances. One of the most dangerous adulterations of wine is by some preparation of *lead*, which possesses the property of stopping the progress of acescence of wine, and also of rendering white wines, when muddy, transparent. The wine merchant will pretend as an excuse, that this is the only process known of rapidly recovering ropy wines.

He persuades himself that such a small quantity of lead employed for that purpose is perfectly harmless, and that not an atom of lead remains in the wine. Chemical analysis proves the contrary; and the practice of clarifying spoiled white wines by means of lead, must be pronounced as unpardonable.

Lead, in whatever form it be taken into the stomach, occasions, as is now too well known, terrible diseases; and wine, adulterated with the minutest quantity of it will, sooner or later, undermine the general health. The merchant or dealer who practises this dangerous cheat, adds the crime of *murder* to that of fraud, and deliberately scatters the poison amongst those consumers who contribute to his emolument.

If to debase the current coin of the country be denounced as a criminal offence, what punishment should be awarded to those who convert into a poison a liquid used for HOLY PURPOSES, that which of all others is the most sacred thing on earth. Oh ! will the day ever come when the God of nature will in vengeance look down on this wholesale murder ? It seems that no law of man is made to prevent it.

Wine may become accidentally impregnated with lead. It is well known that bottles in which wine has been kept, are usually cleaned by means of *shot*, which, by their rolling motion, detach the super-tartrate of potash from the sides of the bottle. This practice, which is so often pursued by wine merchants, may give rise to serious consequences by the shot accidentally becoming wedged in the bottom of the bottle.

Carbonate of soda, and also carbonate of lime and potassa, are sometimes made use of to destroy the acidity of sour wines. Brandy is also added to poor wine to prevent decomposition, and give it strength. These constitute most of the frauds practised in fabricating wine.

Test for Lead.—Pour into a glass two ounces of wine and pass through it some sulphuretted hydrogen gas, as directed previously in this work, when speaking of cheese, and the dark brown or black color will be seen.

Test for Alum.—Take one ounce of the wine and dilute with an equal bulk of water, rain water or distilled water, if it can be had. Let fall into it, gradually, a solution of the muriate of barytes. If a copious white precipitate ensues, which does

not disappear by the addition of *pure* nitric acid, the presence of alum is proved. Carbonate of lime may be detected by evaporating two ounces of the wine to one-eighth of its volume, then adding to the remaining wine twice its volume of alcohol. The tartrate and sulphate of lime are precipitated, and the acetate of lime dissolved. The solution is then strained, and carefully evaporated to dryness.

The strained solution in water gives a precipitate, very abundant with oxalate of ammonia, and gives out the smell of vinegar, when decomposed by oil of vitriol or sulphuric acid.

Wine colored with the juice of bilberries, or elder-berries, or Campeachy wood, produces with acetate of lead a deep blue precipitate; and Brazil wood, red sanders, and "the red best," produce a color which is precipitated red by acetate of lead. Wine colored by the "beet root" is also rendered colorless by lime-water; but the weakest acid brings it back.

7. WHISKEY.

Though there are many adulterations in this article, they are of such a nature that it would be useless to dwell on them, as I could not give as simple tests as would be understood by any but chemists. Suffice it to say, that they are not so dangerous in their action on the system as many others put into spirituous liquors.

CLASS III.

CONFECTIONERY, SPICES, &c.

1. Preserves.—2. Pepper (black).—3. Pepper (white).—
4. Candies.—5. Mustard.—6. Nutmeg.—7. Ice-Cream.
- 8. Sweet Oil.

1. PRESERVES.

IN the preparation of sugar-plums, and some other kinds of confectionery, especially those sweetmeats of inferior quality, frequently exposed to sale in the open streets, for the allurements of children, the grossest abuses are committed. The article called sugar-pease, is chiefly composed of a mixture of sugar, starch, and a sort of clay; and the red sugar drops are usually colored with the inferior kinds of vermilion. The pigment is generally adulterated with *red lead*.

Other kinds of sweetmeats are also rendered poisonous by being colored with preparations of copper, in proof of which I here give the statement of a gentleman on that point. He says:—

“Some time ago, while residing near the house of a confectioner, I noticed the coloring of the green fancy sweetmeats, being done by dissolving sap-green in brandy. Now, sap-green itself, as prepared from the juice of the buckthorn berries,

is no doubt a harmless substance, but the manufacturers of this color, have for many years past produced various tints, some extremely bright, which there can be no doubt are effected by adding preparations of copper.

“The practice of coloring these articles of confectionery should, therefore, be banished; the proprietors of which may not be aware of the deleterious quality of the substances employed by them.”

Some preserves, such as citrons, hop-tops, plums, angelica roots, &c., usually sold in round chip boxes, are frequently impregnated with copper.

Tests.—The adulteration of comfits by means of clay, may be detected by simply dissolving the comfits in a large quantity of boiling water. The clay, after suffering the mixture to stand undisturbed for a few days, will fall to the bottom of the vessel; and on decanting the clear fluid, and suffering the sediment to become dry gradually, it may be obtained in a separate state.

If the adulteration has been effected by means of clay, the obtained precipitate, on exposure to a red heat in the bowl of a common tobacco pipe, acquires a brick hardness.

The presence of copper may be detected by pouring over the preserves some liquid ammonia (spirits hartshorn), which speedily gives to the mass a blue color if the metal is present. The presence of *lead* is rendered obvious by water impregnated with sulphuretted hydrogen, acidulated with muriatic acid (see Article 3, Class I.), which assumes a dark brown or black color, so characteristic of the presence of lead.

2. PEPPER (BLACK).

This is the fruit of a shrubby, creeping plant, which grows wild in the West Indies, and is cultivated, with much advantage, for the sake of its berries, in Java and Malabar. The berries are gathered before they are ripe, and are dried in the sun. They thus become black and wrinkled on the surface. That factitious peppercorns are mixed with genuine pepper, there can be no doubt. Such an adulteration may prove, in many instances of household economy, exceedingly vexatious and prejudicial to those who ignorantly make use of the spurious article. The spurious pepper is made up of oil cakes, common clay, and portions of *Cayenne* pepper, formed into a mass and granulated, by first being pressed through a sieve and then rolled in a cask. The mode of detecting the fraud is easy. It is only necessary to throw a sample of the suspected pepper into a bowl of water; the artificial peppercorns fall to powder, whilst the true pepper remains whole.

Ground pepper is very often adulterated by adding to a portion of genuine pepper, a quantity of pepper dust, or the sweepings from the pepper warehouses, mixed with a small quantity of *Cayenne* pepper. Never buy pepper ground.

3. PEPPER (WHITE).

Ordinary white pepper is factitious, being prepared from the black pepper in the following manner: The pepper is first steeped in sea-water and some other fluids, and then exposed to the heat of

the sun for several days, till the rind or outer bark loosens; it is then taken out of the steep, and, when dry, it is rubbed with the hand till the rind falls off.

The *white fruit* is then dried, and the remains of the rind blown away like chaff. A great deal of the peculiar flavor and pungent hot taste of the pepper is taken off by this process. White pepper is always inferior in flavor and quality to the black pepper.

However, there is a sort of native white pepper, produced on a species of the pepper plant which is much better than the factitious, and, indeed, little inferior to the common black pepper, but "getting it is the thing." Where you get one pound of the genuine article, you get one hundred of the spurious.

It is easy to tell the difference between the two; the *genuine* white pepper has the *outer rind on*, whereas the *spurious* has not.

4. CANDIES.

I doubt not but there are many who have never once thought that candies were adulterated, or that they contained substances positively obnoxious to health. Nevertheless, such is the case. Every mother tries to make a "bug-bear" out of something, to keep her children from using candies, knowing that it is quite injurious to their health, still, she does not know why it is that it makes their *teeth decay, their skin pale, and bowels costive*. It is not the sugar or the sweetness that does it, for the negroes who live on sugar plantations and use large quantities of sugar have re-

markably sound teeth and robust health. What then must we attribute it to? To the *poisonous substances used in manufacturing, or in coloring candy*, which will now be spoken of in detail.

Every confectioners should know, and most of them do know, that such things as they use in coloring candies are *poisonous*. In passing a candy shop, you will see candies made up in the most beautiful, fancy style, tinted with beautiful colors. All, or nearly all of these beautiful colors are given them by some preparation of lead or copper, and sometimes *arsenic*. The yellow color is imparted by chrome-yellow, a preparation containing lead and gamboge—a drastic purgative. The green color is given by Scheele's green, which contains *arsenic* and copper; the red color by vermilion, an article which is adulterated with lead.

To detect the lead, take a piece of the suspected candy, dissolve in water, and pass through it sulphuretted hydrogen, as previously directed, and if the lead is present, the liquid will quickly be turned of a *dark brown or black color*. The presence of copper can be detected by pouring on the candies of a green color, liquid ammonia, which speedily gives to it a *blue* color. If gamboge is present, you will see a thick mucilage when the candy is dissolved, of a *yellow color*. To tell if arsenic is present, throw some of the green-colored candy on hot coals, and immediately by holding it near your nose, you can smell a *garlic odor*, so characteristic of the presence of this poison.

5. MUSTARD.

It is a rare thing to meet with genuine mustard, in powder or in paste ready for use. The article sold as pure mustard, is usually a mixture of mustard and common wheaten flour, with a portion of Cayenne pepper, to make it strong: it requiring but little to make it as strong as common mustard.

Turmeric has been added to mustard to give it a fine yellow color, when a little too much flour has been put in. The presence of this, though in small quantity, can be detected by adding to the *so-called* mustard a few drops of a solution of potash or any other alkali, which changes the bright yellow color to a brown or deep orange tint.

There is a kind of *fine mustard* sold in pots, ready mixed for use; the following is about the way it is made: They take Cayenne pepper, bay salt, mustard flour, wheaten flour, and then make into a stiff paste. Although these adulterations do not seem deleterious, it is, nevertheless, a roguish practice, as the venders of it obtain the same price for a mean mixed-up stuff as for good mustard. There are substances, though, that are mixed with mustard that are very injurious; I refer to yellow ochre, to detect which put some of the suspected mustard in a small iron vessel, put on the fire and let remain until you see the mustard smoking and burning away; if there is any residue left, it is ochre. This test can be applied very easily with a little care.

6. NUTMEGS.

I suppose it is scarcely necessary to say much on the subject of nutmegs being adulterated, as every one has heard that they are manufactured in some of the New England States, and some others, for aught I know, of wood, and sold very cheap. Without commenting on this "Yankee trick," I will speak of some others equally as bad.

The following is a good rule to follow in purchasing nutmegs: They should be dense and have a heavy feel; not worm eaten, or with holes in them, as these holes may have been made by a "two-legged worm," for the purpose of extracting the oil. When, from accident, worms do eat holes in them, some persons are smart enough to stop them, and make you believe—if you haven't read this book—that they are sound and good.

But now let me tell you, that you must not buy them if they feel light and chaffy; it matters not how cheap they are offered, they are dear at any price, and you had as well get a little sawdust and use it, as those worm-eaten nutmegs, or those from which the oil has been taken; that property which gives them their particularly agreeable flavor.

7. ICE-CREAM.

I have merely spoken of this article to convey an idea to the unthinking of what they are eating when they are partaking of this great delicacy.

As regards how it is made, most persons are familiar with the process, and it is, therefore, unnecessary for me to give it here. The ice-cream is

very often made in contact with leaden vessels. The article *called* ice-cream is often, yes, I may say generally, made up of the most abominable, sickening stuff imaginable. The cream from which it is made is often adulterated with rice powder or arrowroot. The arrowroot powder is mixed up with a small quantity of cold skimmed milk into a perfect, smooth, uniform mixture; more milk is then added, and the whole boiled for a few minutes, to effect the solution of arrowroot; this compound, when perfectly cold, is mixed up with a little *genuine diseased cows' cream*.

The worst has not yet been told. It will be recollected that I said, while speaking of milk, that sheeps' brains, and the brains of many other animals, were mixed up with warm water and milk, and sold as "*rich milk*." Now, the article cream is much worse adulterated with brains, as their color corresponds better with cream than milk. Ah, my young man, little have you thought when you invited a female friend—some amiable, lovely, and beautiful young lady, to take some ice-cream with you, that she, as well as yourself, was taking such a sickening, such a filthy compound.

The essence of lemon, vanilla, &c., with the coldness of the cream, is well calculated to deceive the taste, though the brains, of which the cream was made, were in a state of partial decomposition.

To ascertain if the ice-cream contains arrowroot, take two tablespoonfuls of the cream put into a vessel and let it melt. Then add ten or fifteen drops of the tincture of iodine, and the mixture will become of a purple color. The presence of the brains can only be detected by letting a por-

tion of the cream stand in a warm place for about thirty-six hours, when the peculiar odor of decomposing animal matter will be observed. The lead, if any is present, from being in contact with leaden vessels, may be detected by allowing the ice cream to melt, and passing through it sulphuretted hydrogen, when the peculiar *dark brown* color will be noticed. What do you think of eating ice-cream now? As for me, I am not fond of frozen arrowroot and sheeps' brains, even if they are mixed with essences.

8. SWEET OIL.

This is often adulterated with the cheaper oils, such for instance as poppy oil, it being much lower priced than true olive oil. It is said that the taste is but little changed by the addition of the poppy oil. Sweet oil is sometimes contaminated with lead, because the fruit which yields the oil is submitted to the action of the press between leaden plates; and it is a practice (particularly in Spain) to suffer the oil to become clear in leaden cisterns, before it is brought to market for sale.

Pure sweet oil should have a pale yellow color, somewhat inclining to green, a bland taste, and without smell. It is frequently met with in a rancid state.

Test for the presence of Poppy Oil.—Take one ounce of the oil, and pour into a two-ounce vial; shake well for a few minutes and then let it stand, and if there is any poppy oil present you will see little air-bubbles remaining in the oil; pure olive oil soon regains its smoothness on the surface if allowed to remain still.

The lead may be detected thus: Take one ounce of the oil and three or four ounces of water, through which sulphuretted hydrogen has been passed. Pour the oil and the water into a small bottle and shake them for five minutes; if lead is present, the liquid will become of a dark brown or black color.

In places where large quantities of this oil are kept, they frequently put it into leaden cisterns to prevent, as they say, its becoming rancid; and even smaller dealers for a similar purpose put into the oil a pewter plate. This is quite reprehensible, as the oil acts on the lead, producing a condition hereafter to be spoken of.

CLASS IV.

MISCELLANEOUS ARTICLES.

1. Alum. — 2. Cider. — 3. Gunpowder. — 4. Indigo. — 5. Sealing-wax. — 6. Soaps. — 7. Starch. — 8. Soda Water. — 9. Vinegar. — 10. Water. — 11. Beeswax.

1. ALUM.

As this is made use of to a considerable extent, it may not be amiss to say a few words concerning it. A good article of alum should be colorless, and dissolve without much agitation in water. Sometimes alum contains sulphate of iron, to detect which, dissolve some of the alum in water, and add a small portion of the solution of *potash*. If iron is present, the precipitate formed will not be dissolved by an excess of the potash, and it will be of a red brown color, or it will become so in a short time by leaving it in the open air.

2. CIDER.

This ancient beverage is made from the different kinds of apples, which, after long keeping, is very liable to become acid and is converted into vinegar, and is then used for various purposes in the arts, &c. It is often rendered actively poisonous, and many, many are the instances in which it has destroyed life in a few hours.

As a proof of cider being poisonous, I will give the history of a case as related by a respectable physician: "Some cider which had been made in a gentleman's family being thought too sour, was boiled with honey in a brewing vessel. All those that drank of the cider were seized with a severe colic. One of the servants died very soon in convulsions; several others were cruelly tortured a long time. The gentleman of the family in particular, though he had all the assistance which art could give him, never recovered his health, but died miserably affected, after having almost three years languished under a most tedious and incurable malady. On examination, the rim of the brewing vessel was found to be capped with *lead*."

In this case it was a mere accident, but should serve to put persons on their guard in preparing cider for the table. Many narcotic or stupefying substances are added to cider for the purpose of imparting a rich color to it, and to make believe it is strong. Among these may be mentioned the poppy, hops, &c., and to give a bright color, cochineal, elder-berries, and many other coloring substances. Strong alcoholic liquors are also added to cider "*to make drunk come*." When cider becomes a little too acid, lime and chalk are put in to correct it.

To tell if cider contains brandy or whiskey, examine it closely, and you can tell it by the particular odor of each. Cider should not have a strong taste, but be a little acid. To detect lime or chalk, take about half a wineglassful of the cider and add to it a small quantity of oxalate of ammonia; if

they are present, a copious precipitate will fall to the bottom.

To detect lead, which is often put in cider intentionally, to correct an unpleasant taste, take an ordinary glass tumbler, fill it one-third full of cider, and dilute this with an equal quantity of pure water: pass the sulphuretted hydrogen through it, and the liquor will become of a dark brown or black color. The cider must previously be acidulated with a little muriatic acid.

3. GUNPOWDER.

This being an article of considerable importance, any fraud practised in its manufacture, should be known. It is sometimes adulterated with common black sand, to detect which, put some powder on a smooth plank and put fire to it; if there is any sand it will be left on the smooth plank or board. Sometimes, powder is what is called *dusty*. Pass your hand, which must be dry, into a vessel containing some powder, and if it is blackened, the powder is dusty and not good, as it will not blacken the hand if well grained.

4. INDIGO.

Indigo is met with at various prices and in varied degrees of purity—scarcely any being met with entirely pure. I recollect to have seen specimens of indigo that, when put to the test, contained twenty per cent. of soft paper, lint, &c.

Nothing is easier than to detect this fraud. Take a small lump of the indigo, and with a sharp knife trim off into a fine powder; pour on it some

lime-water, and rub between your fingers for a short time, the paper or lint will soon roll up into a wad. This, good indigo will not do, and you can further test it by washing the wad so obtained in a little water, and then drying it, when you can see the texture of the lint or paper. There are some processes given by authors for telling the comparative worth of indigo, but I do not think those who are unaccustomed to making experiments in chemistry could perform them. Should any one wish to prosecute the inquiry further, I refer them to "Ure's Dictionary of Arts," &c.

5. SEALING-WAX.

Besides every other fraud, sealing-wax has also been adulterated. As many persons may not know of what sealing-wax is composed, or how it is made, I will say a few words concerning it, which I hope will not be without interest.

Good sealing-wax is made of pure shell-lac, four parts, one and a half of Venice turpentine, and lampblack or vermilion sufficient to give the necessary color. It is then run into the desired shape.

Instead of being thus made, it is often made of rosin, in place of shell-lac, red lead for vermilion, and common turpentine for the true Venice. Sealing-wax thus made is almost worthless. When you attempt to seal a letter or other matter, the wax runs off before taking fire; when it does this, you may know what is the cause—you have been cheated, in the way just mentioned.

6. SOAPS.

Is there any who would ask the question, "Why do you speak of soap? how can it be adulterated?" If so, let me say to such that I have the best of reasons; as I have, on different occasions, had my face and hands nearly eat up with what is sold for fine soap, and, doubtless, many of you have fared no better.

As regards how soap can be adulterated, it can be done and is done in many ways by the vicious and unprincipled, who make it their daily business. A fraud practised in some of the finer soaps is to put into it lime and white clay. The lime acts very injuriously on the delicate skin, as all must admit.

The rosin soap has frequently a disagreeable smell. This is owing to oleaginous matters being used in making it that are unfit for the purpose. An undue quantity of rosin is also sometimes put in the soap, thus leaving the potash in a condition possessing great corrosive powers, which, coming in contact with the skin, makes it crack and bleed, and if continued will produce sores.

To detect the lime and clay: Take half an ounce of the soap and three ounces of alcohol. Put these in a bottle or flask, and apply a gentle heat until the soap is dissolved. If any lime or clay is present it will remain undissolved.

Persons are often cheated in buying the common bar soap, as it is called, as it contains quite a percentage of water. Every one may convince themselves of this fact by purchasing a bar of the

soap that looks straight, moist, and square, and put it in a dry place for a few days only, when on examination it will be found much less in size, wrinkled, and bent. This is owing to the loss of the water it contains when bought.

7. STARCH.

The principal adulteration of this article is with chalk and gypsum, to detect which, put some of the suspected starch on a hot iron of any kind, and burn it; if any chalk or gypsum is present, it will be left.

Starch often contains an undue amount of moisture, also, which should be noticed in purchasing it.

8. SODA-WATER.

Some of my readers are ready, I fear, to differ with me, almost before saying anything on the subject of soda-water; for, say they, this is a beverage with which we could not dispense in the heat of summer.

Well, you can make up your mind to dispense with *poisonous soda-water*, or dispense with health. But one will say, why do we not see the poisonous effects of the soda-water that you speak of? I reply, that we do see the effects of this poison, daily. I do not deny but what soda-water, in a state of purity, is pleasant, safe, and beneficial; but when it is rendered poisonous by copper and lead, I cannot conceive that it is safe to use it on any occasion. Although we may not see the effects of this poison in soda-water as soon as it has been taken, yet it has its day, like all other

evils. How often is it the case, though, that we hear of persons being taken ill suddenly, and sending for their physician, and on inquiry being made, the patient would say, "I felt very well until I stopped at a drinking establishment and took a glass of soda-water, and I have been feeling worse and worse ever since."

There is scarcely an individual but can call such cases to mind. In other instances, the effect is not so sudden or apparent; but, nevertheless, sure, as the following case will elucidate: "A gentleman was in the habit of stopping every day at a soda-fount to take a glass of soda-water. He continued to do so for two or three weeks, at the end of which time he was seized with a violent attack of *lead colic*. He remained several days before he recovered, in a dangerous condition. When he got well, he again partook of the soda-water, and in a short time a second attack was the result. After recovering the second time he feared the soda-water had caused his sickness, and quit the use of it, and he had no other attack."

I think the proof in this case conclusive, that there was lead in the soda-water. Some may wish to know how lead gets into soda-water; it is thus: the apparatus for preparing the soda-water is generally made of lead, and the carbonic acid acting on the lead dissolves a portion of it. I have, myself, seen the tubes of soda-founts mended with lead, by first melting it and pouring it on the crack in the tube.

In the construction of some of the soda-water apparatuses, copper is also used, thus giving two opportunities to be poisoned instead of one, for it is easy to conceive what will be the result when soda-

water is left in contact with copper for some length of time.

There is also another fraud practised in soda-water. I refer to what is called "*bottled soda-water*," or "*mineral-water*;" this is made by putting a few drops of sulphuric acid (oil of vitriol) to a solution of carbonate of soda, and immediately corking the bottle. This you will see for sale in nearly all drinking establishments.

To detect the lead, make use of the same process I have so often already given in the course of the work. The copper may be detected by adding to the soda-water some liquid ammonia, when it will become of a blue color if copper is present. To prove that sulphuric acid is present in the mineral-water, take one ounce of the liquid, and add to it chloride of barium, until precipitation ceases: then add to the precipitate some diluted nitric acid; and unless the precipitate is all dissolved, you can safely say that sulphuric acid is present.

The sulphuric acid is very injurious to the enamel of the teeth, and persons need not be surprised at any time, that their teeth break off, or decay, if they are in the habit of using the article just spoken of.

9. VINEGAR.

As vinegar is an article of every day use in every family, the consumption of it is very great; and thus, persons void of principle are led to adulterate it.

The fraud generally practised in making vinegar, is to mix with it some strong acid, such as the

sulphuric acid (oil of vitriol), nitric acid (aqua-fortis), muriatic acid (a very corrosive liquid), and oxalic acid (a deadly poison). To detect sulphuric acid, take an ounce or two of the vinegar, and add to it some solution of the acetate of barytes; if sulphuric acid is present, a white precipitate is formed, which does not dissolve in nitric acid. For detecting muriatic acid, take a wineglassful of the vinegar, and add to it some solution of the nitrate of silver; if it produces an abundant precipitate, you may infer that muriatic acid has been added to the vinegar.

The nitric acid can be detected as follows: Take a small quantity of the vinegar, and put it into a vessel that will bear the application of heat; cut or scrape a common goosequill and put into it; apply heat, and if the pieces of quill are stained yellow, nitric acid is present.

To detect oxalic acid, take of the vinegar, two parts; ammonia, one part; put these together in a vessel, and add some lime-water. If there is any oxalic acid present, there will be a copious precipitate of the oxalate of lime. Sometimes vegetable substances of an acrid character are added to vinegar to make it appear strong. These cannot be detected by any chemical test; but, by close observation you can judge of their presence by the vinegar possessing a strong biting taste, instead of an acid taste. It is scarcely necessary to state that vinegar thus adulterated must be highly injurious to health. The daily use of vinegar containing these acids, will soon ruin the finest teeth, and eventually produce bad breath, inflammation of the stomach, ulcerated sore-throat, dyspepsia, and a

long train of evils, which, if the cause is not understood, will lead to death.

10. WATER.

As little as it may be thought of, it is nevertheless true, that water, perfectly pure, is scarcely ever met with in nature. Every one is convinced that the waters which issue from the recesses of the earth, from springs, wells, rivers, and lakes, often differ materially from each other. It is obvious that the health and comfort of families, and the conveniences of domestic life, are materially affected by the supply of good and wholesome water. Hence, a knowledge of the quality and salubrity of the different kinds of waters employed in the common concerns of life, on account of the abundant daily use we make of them in the preparation of food, is undoubtedly an object of great importance, and demands the attention of all.

Foreign matters which water may contain, produce a greater effect on the human system than one at first sight would imagine. None will deny that such waters as are *hard*, or loaded with earthy matter, have a decided effect upon some important functions of the human body. The distressing symptoms under which those persons labor who are afflicted with what is commonly called gravel complaints, are greatly increased by some waters, containing saline and earthy substances.

Many other diseases might be named that are aggravated by hard waters. It is an object of no less importance, also, that water should be soft when employed in some of the arts and manufac-

tures. Soft water is preferable to hard, in the process of brewing, for instance. It is known to those engaged in brewing, that the largest quantity of extractive matter of the malt is obtained in the least possible time, and at the least expense, by means of soft water. We find, also, that, in the art of dyeing, hard water not only opposes the solution of several dyestuffs; but, it alters the natural tints of some delicate colors; whilst in others, it precipitates the earthy and saline matters with which it is impregnated into the delicate fibres of the cloth, and thus impedes the softness and brilliancy of the dye.

In bleaching, waters cannot be used that are impregnated with earthy salts; and a minute quantity of iron in the water, imparts to the cloth a yellowish hue. Many other things of importance concerning the purity of water could be mentioned, but the foregoing is thought sufficient.

The best rule concerning the purity of water for domestic purposes is its softness. This quality is at once obvious by the touch, if we only wash our hands in it with soap. Good water should be beautifully transparent; the slightest opacity or cloudiness indicating extraneous matter. The best plan of judging of the perfect transparency of water, is to put a quantity of it into a deep glass vessel, the larger the better, so that you can look down perpendicularly into a considerable mass of the fluid; we may then readily discover the slightest degree of muddiness much better than if the water be viewed through the glass placed between the eye and the light. It should be colorless, perfectly so, without smell or taste, soft and agreeable. In

pouring it from one vessel into another, it should send out air-bubbles. It is to the presence of common air and carbonic acid, that common water owes its taste, and many of the good effects which it produces on animals and vegetables.

Spring water, which contains more air, has a more lively taste than river water. Hard waters may, in general, be cured in part by dropping into them a solution of subcarbonate of potash; or, if the hardness be owing only to the presence of supercarbonate of lime, mere boiling will greatly remedy the defect; part of the carbonic acid flies off, and a neutral carbonate of lime falls down to the bottom; it may then be used for washing, as it will scarcely curdle soap.

If water is used for washing that comes from a spring, it is advantageous to leave it for some time exposed to the open air in a reservoir, or large vessel, having an extensive surface.

A portion of the carbonic acid thus becomes dissipated, and part of the carbonate of lime falls to the bottom. It is a common belief that the more any spring is drawn from, the softer the water becomes. Rain water, collected with due care as it descends from the clouds, and at a distance from large towns, or any other object capable of impregnating the atmosphere with foreign matters, approaches nearer to a state of purity than perhaps any other natural water. But, collected in this way even, it invariably contains a portion of common air, and carbonic acid gas.

Rain water thus procured, is admirably adapted for many culinary purposes, and various processes in manufactures and the arts. Spring

water is what is generally termed *hard* water, and is not so applicable for most purposes as the rain water. River water, or any running stream exposed to the open air, is, with the exception of particles of alluvial soil in it, more pure than spring water. It is purest when it runs over a gravelly or rocky bed, and when its course is swift. Snow water is also, generally, purer than ordinary spring water, and answers for many purposes where the greatest purity is not requisite.

11. BEESWAX.

Many foreign substances are put into wax, which should be known to those who deal in, or use it, and is a matter of no little importance in a commercial point of view. The cheats mostly practised are mixing with it while in a melted state, resin, potato-starch, pea-meal, tallow, dirt, and sometimes a mixture composed of litharge and oil. To detect pea-meal and dirt, break a cake of the wax, and if it should be very brittle, and of a pale gray color, you may at once infer that they are present. Should this not prove satisfactory, melt some of the wax and strain it, when, if they are present, they can be seen.

Rosin may be detected by breaking a cake of the wax, when a smooth shining fracture is the result, and also by taking small pieces of the wax, putting in a vessel, and pouring on it some alcohol, which acts on the rosin, dissolving it, but does not change the appearance of the wax if pure. To detect tallow, you have only to take a piece of common newspaper and rub it over a piece of the

wax recently broken, and you will see the grease on the paper. Much can be told also by the smell, as that of tallow is very different from wax.

For detecting potato-starch, take of the spirit of turpentine three ounces ; put into this a small piece of wax, say the size of an ordinary bottle cork ; put this on a fire and heat until the wax is melted. If there is any starch present it will remain undissolved.

If wax has been adulterated with starch, it does not possess that bright yellow color which genuine wax does, and it is also much heavier than good wax.

CLASS V.

Lead : its influence on the human system.—Means of preventing its deleterious effects.—Treatment of lead affections, and process for detecting Lead where present.

IN making the remarks under this head, I shall be as brief as the importance of the subject will allow. All technicalities will, as far as possible, be dispensed with, and no language will be used but what is perfectly plain and simple, that it may be understood by all. It has been my object to render this work, throughout, a practical one, for the masses, and not a few individuals; and if I have accomplished that, thus far, I trust the remainder will be equally as much so. You will here have, in *plain* terms, what has hitherto been couched in high-flown professional terms. I shall endeavor to attach a degree of importance to the subject of *lead* that will cause it to be read with due interest, and I trust that, before closing, I shall bring forward sufficient proof to make every one believe and know that, though those who are exposed to this poison may not show its influence by having an attack of lead colic, still, there are many forms in which its influence is felt and manifested in the human system, though the unfortunate individual may never once think that it is this

poison that is undermining his health and blasting his happiness.

In speaking of the influence of lead in producing disease, I shall not confine myself to any particular form or preparation of it, but of lead in all its forms.

It gets into the system, in all instances, in the form of minute particles, unless when taken into the stomach, as is sometimes the case, in larger or smaller quantities, as a medicine or otherwise, before producing its peculiar effect. Its influence is known to be acting on the animal economy by well-marked symptoms. The nervous system is particularly liable to become the seat of disease from this cause. When one set of nerves is the principal seat of disease, we see a certain set of symptoms. Thus, if the nerves of internal life are the seat, nervous action is increased; whereas, if the nerves of external life, as they may be called, are the seat, sensation and motion may be increased, but they may be entirely lost. When an individual has an attack of lead colic, we have evidence that the contents of the abdomen are the seat of disease. If there are sharp pains in the organs of external life, or if a part becomes paralyzed, the nervous centres of the spine are affected. Lead, when it gets into the system, may cause a variety of affections, but is not apt to cause two different diseased conditions in the same individual at the same time; still, the same person may have one attack of lead disease, and it will manifest itself in colic, and at a second attack he may have nervous pains, paralysis, or affection of the head.

The most frequent disease from lead is undoubt-

edly colic; with it may, or may not occur, some other forms of lead disease. After an individual has had an attack of one form of lead disease, he is more liable to all the other forms than one who has never had an attack of the disease: the presence of the metal in the system seems to predispose to any and all forms of the disease.

Although the first attack may be mild, that is no proof that in a subsequent attack it will not be severe; and if the first attack is severe, we are not justified in saying that subsequent ones will be equally so, or worse.

Why it is that the same poison will produce different effects in the same individual under similar circumstances, we are not able to say with any degree of certainty.

As it will be of some importance to the reader, I will leave out unnecessary forms and classifications, and proceed to give such information on this subject as I think of most importance to those unacquainted with medicine.

It is of no little importance to know that, before lead displays any effect on the system, there are certain premonitory signs or symptoms, by which we can tell that a "storm is rising," which, if not guarded against, will soon burst in tones of thunder over our heads. This is a wise provision, and we should look well to it, for it is one of the best safeguards that could be given.

The old adage of "an ounce of preventive is worth a pound of cure," holds as well in the case under consideration as in any of which I have any knowledge. These premonitory symptoms are observed in persons working in lead, as those

working in lead mines, manufactories of white lead, litharge, &c., long before they experience any symptoms of pain or other effects from the lead. The lead in these cases gets into the system by being taken into the stomach and the lungs, and very soon a sufficient quantity is taken to show its effects. In other cases, the effect is not shown so soon, as in the case of house painters, manufacturers of earthen-ware, type-founders, &c.

The premonitory symptoms are not displayed in sheet-lead workers, and lead in a state where no dusty emanations are taking place, but they are not free from danger on this account, as they may be seized suddenly with an attack of some form of the disease.

In this case as all others, some persons are more liable to have an attack of lead disease, from the same exposure, than others.

These premonitory symptoms consist in lead taste, lead odor, lead breath, leaden yellow discoloration of the skin, emaciation, discoloration of the lining membrane of the mouth and the teeth, which are of a leaden hue.

The leaden taste is at once peculiar, and is described by patients as being of a sweet, rough, astringent nature, similar to that produced by holding a piece of the metal in the mouth for some time. Some complain of its being rancid, and as if the mouth was drawn up. Although this taste is present, few, if any complain of morbid secretion from the mouth; and some even complain of dryness of the mouth and throat occasionally.

The lead odor consists in this; persons that are working in lead, after a greater or less time, if

they are getting under its influence, complain of smelling the metal all the time; it matters not whether they are where lead is or not, the sensation is constantly annoying them.

The lead breath is hard to describe; it is what some call a *cold breath*, or a sensation as if "every breath they bring is cold," and the patient will try many remedies to get rid of it, such as chewing pepper, ginger, &c., and taking hot fluids into the mouth, but all does not relieve the sensation.

Leaden yellow color of the skin is easy of detection, when it exists to any great extent, the skin being of an earthy yellow tinge; but if the disease is less severe, the color is paler and somewhat ash-colored.

This peculiar color is to be seen more perfectly marked in the face; yet traces of it can be seen on other portions of the body. Persons thus affected are often thought to be laboring under some biliary derangement, and may be treated for such by the unthinking. The yellow color is observed also in the urine.

So permanent is this yellow tinge, that it remains after life is extinct, being observed on different parts of the body on dissection. Lead is sometimes taken into the system in such quantities that it has been detected in the blood. It is easy enough to distinguish between the yellow tinge of the skin produced by lead, and common jaundice. In jaundice, the yellow color is brighter, and borders somewhat on green; there is the condition always present in jaundice that is not in yellowness from lead.

Emaciation is observed only when large quanti-

ties of lead have been taken into the system, and this generally in those that work in places where emanations of lead are constantly going on. Some persons cannot work in establishments of this kind longer than a month or two before the emaciation is observed.

The change produced in the blood is said to be the cause of emaciation.

Discoloration of the lining membrane of the mouth and of the teeth, is an important symptom. It consists in a discoloration of the gums nearest the teeth, for a line or two in extent, of a bluish or slate-gray color. The outer portion of the gums is of a light bluish-red color. There is with this, loss of substance in the gums; they sometimes become very thin, or they are partly absorbed, leaving the teeth bare. Sometimes the gums become tender, and they bleed on being touched. The lining membrane of the mouth is liable to become of this leaden color also. The teeth become of the same color, and when once discolored they are ruined, for very soon they become brittle, decay, and break off before they would otherwise do so, by many years. This color is very difficult to remove from the gums and teeth. The means to be employed for removing it is to take a glass tumbler and fill nearly full of water, and add to it fifty or sixty drops of nitric, sulphuric, or muriatic acid; with this the parts are to be washed once or twice a day. If this should be too strong, make it weaker by adding more water, if not strong enough add more acid. This leaden discoloration of the gums, teeth, &c., is not observed in every person

that has lead disease, but in a large number—a majority of them.

LEAD COLIC being the most frequent form of disease produced by this metal, I will consider it first, and give what I consider of most importance as to its causes, symptoms, treatment, &c. This is a *neuralgia* of the digestive and urinary organs, produced by the introduction of lead in some form into the system. It is marked by sharp, continuous pains in the abdomen, with exacerbations, which are diminished by pressure, or if increased, it is but little ; there are hardness and depression of the abdominal walls attended by obstinate constipation, vomiting, or nausea, an escape of gas from the bowels by belching, loss of appetite, difficulty of voiding urine, the pulse slow and hard, restlessness, increase of the sensibility, a loss of contractile force, and diminished secretion of the organs involved.

All the symptoms just pointed out may not appear in any one attack of the disease, but most of them are generally observed.

The lead is sometimes taken into the system in the form of vapor or dust, through the medium of the lungs; sometimes into the stomach as medicine, and by small particles getting into the mouth, and then swallowed with the food; or it may be taken up by the absorbents of the skin, according to some authors, but I think not, unless the outer coat of the skin is off. Lead, when taken into the stomach in the solid form, as a bullet or shot, does not get into the system, as the fluids of the stomach are unable to dissolve it, and an oxide is formed on the surface. Preparations of lead, when given

as medicine, produce lead colic if continued a length of time, and some have had it after taking only one dose. Lead of tin gets into the system by means of cooking utensils being lined with an alloy of tin and lead. Wines, as before stated in this work, often contain lead, which is a fruitful source of this disease. Water, passing through lead pipes, becomes impregnated with the metal, if there is any access of atmospheric air; and even when there is no access of air, if the water contains much carbonic acid, as is often the case, a portion of the metal will get into the water.

The lead used in coloring candies is another source of this disease, and many, many are the children that daily fall an easy victim to death from this cause. The attending physician may never once think that the little patient is suffering from this cause, and thus it goes on until the innocent child finds relief in the silent grave. The fancy papers used in putting up candies are painted with lead, and the child, not thinking of its being a poison, chews, and perhaps swallows the paper, thus producing the disease. Chocolate is sometimes covered with lead foil, and if there is any dampness in the chocolate, some of the lead gets into it, and then being used, finds its way into the system, carrying with it the lead.

Snuff is also put up in lead foil, but which persons are made believe is *tin foil*; this snuff when used, comes in contact with the lining membrane of the nose and mouth, and is absorbed, and carried into the system. By sleeping in newly-painted rooms, or near a wall recently painted, the emanations of lead are taken into the system,

through the respiratory organs; one night in such places, is sometimes enough to produce lead disease in some form.

Lead colic has been produced in persons engaged in the following occupations: house-painters, paper-stainers, perfumers, grinders of colors, manufacturers of glazed cards, manufacturers of white lead, manufacturers of red lead, manufacturers of mineral orange, gilders on wood, varnishers of metals, manufacturers of earthen-ware and china-ware, plumbers, sheet-lead workers, workers in putty, workers in tin, refiners, jewellers, copper founders, type founders, bronze founders, printers, manufacturers of shot, &c. &c. It will be seen by this list, that many who consider themselves free from danger, are in the very midst of it.

Printers should avoid holding type in their mouth, as they often do, while correcting typographical errors, as they are apt to swallow particles of lead in this way.

Persons working in lead are often careless, and do not pay that attention to cleanliness that they should do, which is a fruitful source of lead colic. Relapses are liable to take place where an individual has once had the disease, though he may never have worked in lead, or laid himself liable to lead poison in any way after the first attack.

Before being attacked with lead colic, the premonitory symptoms, before enumerated, generally present themselves in a greater or less degree, and in addition to those before named, there are generally slight pains in the bowels, which may remain nearly stationary for several days. But lead colic comes on, sometimes, suddenly, without any

pain being felt previously in the bowels. The symptoms, in most cases, are well defined; one of the most prominent of which is pain in the region of the umbilicus (navel). It may be seated below or above this point, or to either side, but not so often. It is described by patients as being a violent twisting sensation, or some describe it as a sharp, tearing, pricking, burning, or boring pain; nearly all having some particular description of their own suffering.

This pain is generally relieved by pressure, but sometimes it is slightly *increased* by it. It comes on in fits, as it were, and throws the patient into the greatest agony. He tosses from side to side with an anxious look, screams, cries, and moans. He often throws himself into the most odd positions, across the bed, on the floor, doubles himself up, tries to walk, says he will die, and clasps his hands on the bowels. Sometimes, they will shiver and tremble like a man with an attack of chills, and many other expressions of their great suffering are manifested.

When the fit partly ceases, the patient lies quiet, trying to rest from such fatigue as his motions have brought about. Another paroxysm comes on, the same symptoms are seen, and thus exacerbations and remissions continue until the attack passes off.

The suffering is worse at night than during the day. With the pain there is nearly always costiveness, though in a few cases diarrhoea is present.

The bowels seem hard and the abdomen is depressed, and lumps or knots are felt through its walls. There is generally some nausea, and also

vomiting, but vomiting does not occur so often as the nausea that is complained of.

It is observed that persons laboring under an attack of lead colic are troubled with sleeplessness, even when there is little or no pain felt, and though the patient is much exhausted from his suffering.

The peculiar appearance of the face of one suffering under this complaint, is observed by every person: it is wrinkled, contorted, and is expressive of acute suffering, never forgotten when once seen, but hard of description. Though there may be some acceleration of the pulse, there is no fever in this affection, the dryness of the skin is peculiar to the disease, and the pulse may be slower, sometimes, than natural.

The voice is at times quite weak or tremulous, and some patients will not try to talk, fearing it will produce a paroxysm of pain.

The appetite is usually lost, but there is not often loathing of food. Some patients complain of great thirst, while others do not speak or ask for drinks for some time. The peculiar color of the teeth spoken of while on premonitory symptoms, is generally noticed in lead colic; also some aching, which cannot be referred to a decay, in every instance; in fact, it is peculiar to the disease.

The pain is the first symptom of lead colic (after the premonitory symptoms), all the others following; and when the pain ceases, the attack may be considered at an end.

There may be and sometimes are complications of lead colic. The same person may have lead colic and the other lead affections, to be spoken of hereafter. There is, sometimes, inflammation of

the stomach or bowels, or the patient may have dysentery, inflammation of the membrane lining the abdomen, or he may fall into a low typhoid condition, or have typhoid fever.

If there is inflammation of the stomach with the colic, vomiting will be frequent—no food will lie on the stomach, and drinks excite the stomach to renewed efforts in throwing off its contents; there is a burning sensation at the pit of the stomach, and a sensation as if something was twisting or rolling. The tongue is dry and coated with a white fur, under which is a slight redness; thirst incessant, and the bowels swollen; high-colored urine and small in quantity, skin dry with burning heat, acceleration of the heart's action, and redness of the face.

In inflammation of the bowels with lead colic, there will be tenderness on pressure over the region of the pain, with, perhaps, evacuations from the bowels. Should dysentery occur in colic, the evacuations from the bowels will be frequent, attended by griping, and the stools will be bloody, mixed with mucus.

Should inflammation of the lining membrane of the abdomen (peritoneum), set in, the abdomen will be very tender, the slightest touch producing great pain, the patient troubled with hiccoughs, and frequent pulse.

These complications, very fortunately, are not common.

The duration varies very much, and no precise time can be stated, in which the attack will terminate, as that is governed by circumstances, progress, treatment, &c. A severe attack is apt to

continue longer than a mild one, all things being equal.

A colic resembling that produced from lead, is brought on by copper; the symptoms of the two though are very different. In lead colic, the pain is seated in a small spot in the navel region; in colic from copper, the pain is felt in all of the abdomen. Pressure relieves lead colic; it aggravates colic from copper. The abdomen is swollen in colic from copper; it is contracted in lead colic. In lead colic, there is constipation; in colic from copper, diarrhœa often attends, and the discharges are abundant, slimy, and greenish. The nausea and vomiting attendant in lead colic, are not often observed in colic from copper.

These, with many other distinguishing signs, are sufficient to tell one disease from the other without any difficulty.

The difference between lead colic and ordinary pains in the stomach and bowels, called in medicine *gastralgia* and *enteralgia*, is as follows: In lead colic, the pain is not increased by pressure; in the other case it is. In enteralgia and gastralgia, the evacuations are natural; in lead colic, hard and unnatural. There are no hardness and depression in gastralgia and enteralgia of the abdomen, in lead colic there is. The pulse in lead colic is slow, hard, irregular; in the other, feeble, slender, irregular, and frequent. In lead colic, emaciation is rapid and decided, in the latter, scarcely perceptible, and not for some length of time noticed.

In lead colic, there is headache; in the other, none: in lead colic certain muscles are palsied: in the other this does not exist.

Many other points of difference might be mentioned, but what has been given is considered sufficient to distinguish between lead colic and any other form of colic.

The termination of lead colic, if properly treated in time, is generally in health. Other lead affections coming on during lead colic may prove fatal. When lead has been in the system a long time there is a greater liability to other forms of lead disease supervening than when the individual has been exposed for a short time to lead.

Relapses are unfavorable, as they indicate that the poison has taken a powerful effect on the system, and from which cause, the brain may become affected. The nature of lead colic is strictly of a neuralgic character.

As regards the treatment of this affection, there have been as many different modes, almost, as there have been authors who have written on the subject. I shall not attempt to occupy time and space in giving these different modes, but merely the course of treatment most highly recommended by the medical faculty at the present day.

The great remedy in this disease is croton oil. I am well aware that many persons are unwilling to administer this powerful medicine, but though so powerful there is none so efficacious. And when an individual is suffering from lead colic, any remedy that will relieve them is the one to be made use of.

The course of treatment pursued should be as follows: When a person is attacked with lead colic, the first thing to be done is to administer a dose of croton oil. One drop should be given for

a dose, and this should be repeated every hour, until free evacuations are produced from the bowels. The best way to give the oil is to take one tablespoonful of water, made sweet with loaf sugar; add to this one drop of the essence of peppermint or cinnamon, and then put in the croton oil. This is to be given to the patient, which will not be so apt to turn against the stomach, as the oil frequently does, unless the essence is added.

Should the oil not act on the bowels in the course of four or five hours, two drops may be given every hour, and with this treatment may be conjoined injections, consisting of castor-oil, spirits of turpentine and warm water. Take four ounces of castor-oil, two ounces of spirits of turpentine, and one quart of warm water; inject half of this into the bowels, and if an operation is not procured in one hour, use the remaining portion.

The croton oil will sometimes disagree with the stomach, and produce vomiting. When this is the case, you will have to use it by means of injections. Take of common starch one ounce, warm water half a pint, croton oil four drops. Inject this, and rub five or six drops of the oil over the region of the bowels at the same time.

By these means, the bowels will be apt to be moved in the course of five or six hours. After the bowels are freely opened, unless the purgative treatment is continued, another paroxysm of the colic may be expected on the following day. To prevent this, one drop of the croton oil should be given about twelve or fourteen hours after the first action of the bowels, unless they are very free. Should this be the case, give the following:—

Take Pulverized Aloes grains xx;
“ Rhubarb “ xx;
“ Opium “ iii;
Extract Colocynth “ x.

Make into xii pills, one to be given every hour. This will keep the bowels in a good soluble condition.

During the violent paroxysms of pain, the patient should take chloroform, either alone or in combination with something milder. The following combination will be found very efficient, and will generally relieve the pain considerably, if not entirely, for a short time:—

Take Tincture of Hyoscyamus 100 drops.
Essence of Peppermint 100 “
Chloroform 1 teaspoonful.

Mix.

Half of this to be taken for a dose, and if it does not relieve the pain in a short time, the remaining portion is to be taken. The mixture should be given in a tablespoonful or two of brandy toddy.

Sometimes pains in the abdomen will continue for several days after the patient considers himself well. To relieve these, it is necessary to persist in the use of purgatives, such as a combination of rhubarb and aloes, castor-oil, or it may become necessary to use a drop of the croton oil every second day.

If, after the patient has been easy for several days, he feels an uneasy sensation in the abdomen again, it may be necessary to resort to treatment as active as that first made use of.

The patient should not take any solid food so long as any symptoms of the disease remain. The diet should consist of arrowroot, rice water, tea, coffee, and food of that character, all of which is to be given in small quantity; for, otherwise, the patient will have a return of all the violent symptoms. The patient, if one that has been working in lead, should desist from his employment for some days, and even a few weeks would be much safer, if he is so circumstanced that he could rest that length of time.

Should he return to his work too soon, another attack, and that, too, in a short time, will be the result.

There is another affection produced by lead, commonly called *lead neuralgia*, or a pain, commonly appearing in the joints, of a nervous character. This pain may exist in the whole course of a limb as well as in the joints, and there is scarcely any part of the body but what may and does, in different cases, come under its influence. This form of disease often exists at the same time that lead colic does, to a greater or less extent.

The cause of lead neuralgia is the absorption of lead into the system. Those most liable to have an attack of this disease are those that work in red lead. It is oftener produced by applying some preparation of lead to a part of the body from which the skin has been removed, than lead colic is from the same cause. This form of lead disease is also more apt to be developed by inhaling minute particles of lead than lead colic is. It has been produced by making use of eye-water made of the common sugar of lead.

It has also been produced by applying lead in some form, to a part recently scalded, from which the skin has been removed. We can judge of the approach of lead neuralgia by the following signs: A sensation of numbness, or what is commonly termed "sleepy feeling," is felt in the part about to be attacked.

The part feels as if it had been overworked, and wanted rest, though it may not have been used any more than any other part of the body. This feeling may last for some time, one day quite troublesome, another scarcely noticed by the patient, but eventually some night when least thought of the insidious foe comes to drive sleep from the eye, joy from the heart, and wrap the frame in misery.

Or it may be that some bright morning, when rising to go forth to the daily occupation, or enjoy the sweetness of life in festivity, that the individual is suddenly checked, and thrown on a bed of affliction, and woe to the poor sufferer, if his physician should happen to overlook the cause of his suffering. But I trust now the means will be in the hands of all, by which they can not only detect the disease, but speedily cure it.

The symptoms which characterize this disease are very often taken for those of other diseases. The most prominent symptom is pain of an acute form; though it may be of a dull, heavy character, and it varies in this respect; sometimes the pain amounts to nothing more than an uneasy sensation in the part for a short time, then the patient will suddenly be seized with an acute pain in the part.

There is also loss of power in the affected organ.

The parts most frequently the seat of this affection are the lower extremities. The upper extremities are often affected also, but not as frequently as the lower. The pain in the lower extremities is generally seated in the back part of the thigh, sole of the foot, calf of the leg, and the groin.

When seated in the upper extremities, the palm of the hand, forearm, arm-pit, fold of the elbow joint, and the hand, are the parts principally involved. The pain in either case is worse in the joints than the other parts; thus motion is painful, but pressure relieves rather than aggravates the suffering.

If the trunk is the seat of the affection, the pain will be felt in the back, in the course of the spine, or it may attack the sides of the chest. Should the head be the part where the pain is seated, it will be felt in the face or top of the head.

The character of the pain as described by different persons suffering from it, is not the same in scarcely any two cases. One will say it is sharp, pricking, biting; another, that it is a numbed, dead, fatigued sensation; some that it is burning; then again one will say it is a feeling of coldness, another that he feels like some insects were crawling over him. This difference is owing to the peculiarities of each individual, or at least I do not know what else to attribute it to, as the cause is the same in all cases. The pain is not steady, but comes on in spells similar to the paroxysms of colic.

During the spells of greatest suffering, the patient will, if lying down, rise suddenly, clasp hold on some part of the limb affected, and press it with

all his strength, at the same time giving vent to lamentable moans and cries; he is greatly agitated, restless, and desponding. This condition exists for a few minutes, and then the patient becomes more calm, and the pain to a great extent ceases, but not entirely.

If the patient lies perfectly still, there may not be a recurrence of the paroxysms for some time; but it is frequently the case, that the least move, or even an emotion of mind, a stream of cold air, and many such things will bring on an attack.

After suffering for some time, the paroxysms do not occur, or if so, not often; the patient then complains of a continued pain, but it is not of that character that was present in the commencement; it is more dull and aching.

There are cramps in a certain number of cases of this disease, in fact in some cases they are the most prominent symptom. During the cramps you can feel the muscles contracting, which passes off in the same way as pain without cramps.

Though there are such violent pain, cramps, &c., there is no redness or swelling of the limb in this affection. When the lower extremities are affected, it is difficult for the person to walk, and the limb seems bent at the joints.

The pain, if seated in the back or the loins, deprives the patient of using the parts; for instance, he cannot bend or stoop without great increase of the pain, and when the pains are in the chest there is difficulty of breathing. The pain is very prone to change its situation, one day being in one part, and the next day in another part. In this disease as in lead colic the patient is liable to have a re-

lapse, and more especially if the cause that produced it is not removed.

If properly treated it should be cured in from three to six or seven days. With this, may occur lead paralysis, or palsy, to be spoken of hereafter, but the two are not apt to affect the same part at the same time. Thus there may be pains in the lower limbs and paralysis of the arms at the same time, but the former is generally somewhat diminished in intensity before the latter appears.

This disease may be confounded with others, another may be taken for this, or this affection may be thought simply the common diseased conditions of these parts, but by examining the following rules there can be no difficulty in distinguishing this from any other disease.

It may be distinguished from acute rheumatism, by the absence of redness and swelling, and by the absence of tenderness on pressure, all of which is present in acute rheumatism. The least motion increases the suffering in acute rheumatism; in this affection the patient jumps out of bed often without experiencing any discomfort. Rheumatism is of longer duration than the disease under consideration. There is also feverishness in the affected part in rheumatism but not in lead neuralgia.

It resembles chronic rheumatism a little, but the rheumatism does not terminate so soon, and the joints are also swelled, and tender on pressure. It differs from common neuralgia, in not taking the course of a nerve, and in common neuralgia the pain remains at the same point day after day, whereas in lead neuralgia the pain changes

from place to place. Besides this, there are some of the premonitory symptoms usually present in lead neuralgia. The seat of lead neuralgia is undoubtedly in the nervous system. Dissection shows no changes in the affected organs.

The treatment of this disease, like that of lead colic, has been the source of strong contentions in medicine, but my remarks on the subject will only relate to what I consider the best mode: facts deduced from the experience of the most eminent men in the profession. The best remedy for this loathsome disease is the sulphurous baths.

Five or six ounces of the sulphuret of potash should be put into the bath, and this bath should be taken once every day for eight or ten days, warm.

With this treatment, purgatives should be made use of, and as one that will produce a powerful revulsive effect, none is better than croton oil.

Of this, one drop should be given as directed in lead colic, and repeated in ten hours if the bowels have not been freely moved.

The bowels should then be kept open with flows of sulphur and cream of tartar.

Take Flowers Sulphur $\text{oz}\frac{1}{2}$;
Cream Tartar $\text{oz}\frac{1}{2}$.

To be taken at bedtime in water. Should this dose be too large, reduce it to half the quantity. The skin is very apt to become of a dark color after using the sulphurous bath, but it is of no importance, as it is only a compound formed and deposited on the skin—"sulphuret of lead."

While taking the bath, the patient should avoid

inhaling any of the vapor that rises, by immersing in the bath up to the neck, and protecting the nose and mouth by means of interposing a blanket or any thick cloth between them and the water.

It is stated by some physicians that purgatives, and especially the more drastic kind, are unnecessary in the treatment of this form of lead disease, but I cannot see that they do any harm, and certainly have seen them do much good, and would advise those that are so unfortunate as to get the disease, to have recourse to them by all means, if they desire a speedy cure.

Another form of disease produced by lead, is one called, *lead idiocy, madness, lead coma, mental alienation, &c.* It does not matter so much about the names, but the disease has an important bearing, and it is one to which I would call particular attention, as it is, generally, but little understood, and is more apt to be overlooked or treated for another disease.

This affection displays itself in delirium, convulsions, coma (drowsy, sleepy feeling), and perversion of sensibility. These symptoms arise from the effect of lead on the brain.

It is true that symptoms similar to these do arise when no lead has been taken into the system, but the characteristics of this affection, when pointed out, will show the difference in the two. The features of this disease are very changeable; in the morning one symptom will be most prominent, and in the evening this will be entirely absent, and its place supplied by others.

It comes on sometimes suddenly, and goes off with the same rapidity. It is not so common in

its occurrence as lead colic, in fact, it is the rarest form of lead disease. That lead will produce the disease in question, is proved by the fact that persons go into lead establishments, having never experienced any symptoms of alienation of mind or mental derangements, and after working there for a certain length of time, they become affected with symptoms hereafter to be pointed out more clearly.

Sometimes a short time only is necessary for persons to work in lead, until the head symptoms are developed; again it requires a long time.

There are generally some precursory symptoms of this affection; a constant headache is one, and accompanying that there is also, frequently, a feeling of giddiness in the head. Wakefulness is another; paralysis or palsy sometimes precedes the lead symptoms, or there may be lead neuralgia, before spoken of.

The symptoms of this disease are, a delirium or wandering state of the mind, somewhat variable in its nature; a heaviness and general weakness of the intellect, and there is an inability to perform the ordinary occupation; following this is a drowsy, stupid condition, so much so that the patient pays but little attention to surrounding objects.

Instead of all these symptoms presenting, only one may occur during the entire course of the disease, or they may follow each other in rapid succession.

The delirium that is present is of two forms; one in which the patient seems stupid, sad, and melancholy, and he is quiet, as if resigned to his fate. At the same time if the patient is spoken to, he

is apt to give an answer showing at once his state of mind. Sometimes it is necessary to speak to them very loud to attract their attention; others will talk constantly, as if some person was conversing with them, though they may be alone in the room.

They are restless, and it is with difficulty they are persuaded to lie in bed. Some will complain that one of his neighbors is trying to injure him, another hears beautiful music, another is affected with continual fear, &c., and many other like symptoms will arise during the course of the disease.

The other form of delirium is quite different. In it we observe the eyes thrown open, and the patient staring in amazement at some object; he showers threats of vengeance on his best friends; even the partner of his bosom, if he is married, cannot soothe him; he is continually in a rage, with haggard appearance, his features pinched up, he utters cries, curses, and sometimes lamentations, in a word he is what is commonly called "*raving mad.*"

Sometimes there are convulsions also. After the delirium has continued for a time there is a calm that follows, but this intermission does not last long, until there is a return of the symptoms in all their former fury. After one of the attacks there may follow a sleepy, drowsy state, the patient lying with his eyes partly closed, then waking suddenly, he is taken with the delirium, or perhaps convulsions.

With this disease may exist other forms of lead disease, such as the lead colic, lead neuralgia, paralysis, &c. Either one of these forms may be

present with the head symptoms, or two of them at the same time.

To distinguish this affection from ordinary convulsions or mental derangement, it is necessary to take into consideration the fact of the individual having worked in lead, or having been exposed to its influence in any way whatever. And a still surer symptom is this: if an individual has had an attack of lead colic, or any other form of lead disease, and after that is taken with the symptoms just pointed out, you may rest assured that the disease is the one now under consideration.

The premonitory symptoms previously spoken of, are apt to precede this disease, or at least some of them. The delirium in inflammation of the brain is not intermitting as in this case. In inflammation of the brain, there is also an acceleration of the pulse, which is not observed in this complaint.

This affection is very grave; not more than half of the persons attacked ever recover. Lead has been detected in the brain after death by chemical tests.

The treatment, according to the best authors, can be summed up in a few words. It is the expectant, or do nothing treatment; nothing being ordered more than simple mild drinks, and low diet. The course that I would advise is the following: When an individual is taken with the symptoms before spoken of, and you are convinced, after making every examination into the case necessary, that it is from the influence of lead, you should give a purgative of the croton oil. One drop will be sufficient; should this not operate in eight or ten hours, repeat the dose. He should

be put into the sulphurous baths once every day, as directed previously, while speaking of lead neuralgia. And in addition to this he should take the following mixture:—

Take Ether, sulphuric	1 ounce ;
Laudanum	1 ounce ;
Chloroform	$\frac{1}{2}$ ounce ;
Essence Peppermint	20 drops.

This is to be shaken well together, and give of it 30 drops every hour, mixed with a little gum water ; should this not relieve the symptoms, double the quantity should be given. The gum water may be made thus:—

Take Gum Arabic	$\frac{1}{2}$ ounce ;
Water	4 ounces.

Let this stand for half an hour, and you will have a thick mucilage.

Should the patient become quiet under the use of the mixture given above, discontinue the use of it, to be renewed if the symptoms return, which is apt to be the case in the course of a few hours. The diet should be light, consisting of soups, rice water, &c.

By this course of treatment I am inclined to think that many can be saved that would otherwise be lost.

PALSY.

Paralysis, or palsy, is another form of disease produced by the absorption of lead into the system. Paralysis from this cause may consist in either loss of motion or of sensation. There is a distinction

generally made between the two forms, from the fact that a part may have loss of sensation, and at the same time the power of motion remain unaffected. The loss of motion is called *lead paralysis*, and the loss of sensation, *lead anæsthesia*. Though this distinction is made, the two forms sometimes appear in the same part at the same time.

In the *paralysis*, there is loss of voluntary motion, there being no contractility of the muscles in which the disease is seated.

It has been observed that the muscles which assist in extending the limb, are most apt to be affected.

The other lead affections may exist at the same time with this; thus, a person may have lead colic and paralysis at the same time, or the colic may cease on the appearance of paralysis.

In this, as in all other forms of lead disease, there are certain signs that give notice of approaching danger. In the part about to become affected with the palsy from the influence of lead, there is a feeling of numbness, coldness, or pricking, and the part feels weak and heavy.

There is a particular paralysis of the muscles of the forearm, called "wrist drop," which looks peculiar; there is an inability to use the part when thus affected.

The symptoms which present in this disease are easy of distinction. The paralysis may be complete, when no motion can be executed by the part, or partial, and then motion in a certain degree remains. The paralysis is mostly confined to the upper extremities, but it may attack almost every part of the body.

It commences by slight trembling and numbness, and increases until it reaches its height. The limb does not seem stiff, as it can be moved in any way by taking hold of it. The disease progresses slowly.

It may remain for only a few days, or it may last for years, and even for a lifetime. It is more favorable when occurring in a young person than otherwise. It is easier relieved when only one muscle is affected than if the whole limb is involved. It may terminate in health, change to another disease or death.

The return to health when it does take place is in a gradual manner, not rapid as in some other lead affections.

To distinguish paralysis from the effects of lead, from that depending on a morbid condition of the brain, or spinal marrow, it is necessary that the history of the case should be taken into consideration.

If the individual has been working in lead, or in any way exposed to its influence, there is reason at once to suspect lead paralysis, and more particularly if any premonitory symptoms have shown themselves, or he has previously had an attack of some form of lead disease.

The peculiarity of the paralysis will also be of service in forming an opinion.

This is one of the most serious affections produced by lead, as the patient is very apt to be so disabled that he cannot pursue any occupation by which he could earn a livelihood; though it does not often terminate fatally. Its seat is in the nervous system.

The treatment should be as follows: As soon as the patient is seized with this paralysis, he should be put to bed. Then give him, the first thing, the following pill:—

Take Rhubarb, pulv. grains 10 ;
Aloes, pulv. grains 10 ;
Extract Colocynth grains 10.

Make into six pills, two to be given every five or six hours, until free purging is produced.

The sulphurous baths should be used once every day, and, to produce action in the affected muscles, strychnine should be given. It is a powerful remedy, and must be used with due degree of caution.

Take Strychnine 1 grain,
have this well mixed with Gum Arabic; or wheat flour, and make into sixteen pills. One of these pills to be taken night and morning. Should this not excite the muscles to slight twitching, or jerking, two pills should be given, night and morning. If the dose is too powerful it will produce a trembling in the limbs, and a dead heavy feeling, and there will be powerful muscular action. When this takes place, the medicine should be discontinued for a day or two, and then begin again with smaller doses.

A blister should be applied to the affected part, and after the outer skin is removed, about one-quarter of a grain of strychnine should be sprinkled on the blistered surface.

The part should be well washed every morning, and more of the medicine put on as before.

Should the symptoms of an over-dose, or too

powerful effect of strychnine arise, the use of the medicine should be suspended for a short time, to be renewed if necessary: strychnine is, of all, the surest remedy in this disease.

The galvanic battery should also be tried, if the means already pointed out do not relieve the case. The shocks should be passed through the parts affected once every day, until a fair trial has been given.

By pursuing the course just spoken of, a large majority of the cases can be relieved. During the course of the disease the bowels should be kept open, and occasionally before bedtime the skin should be rubbed with a soft cloth and lukewarm water.

The patient must desist from working in lead, if he has been engaged in it, or remove from its influence, let it be acting in what way it may. He should use the affected limb when he has any power so to do. The diet should consist of soups, tender beef-steak, chickens, and fresh vegetables, such as potatoes, asparagus, &c.

He may be allowed also the use of beer, wine, coffee, and tea, in moderation; it will be good to promote digestion, and keep up the system, thus favoring the operation of the curative measures previously pointed out.

The affected part should be rubbed occasionally, near where the skin is off, with a warm flannel, moistened in sweet oil.

In what is termed anæsthesia, or loss of sensibility in a part, the loss of sensation may only extend to the skin, or it may affect the parts much deeper. This loss of sensibility may exist and at

the same time the patient will have good use of the organ.

The approach of this affection is generally sudden; and is confined to one limb or one side of the body. The skin can be pinched, pricked with a sharp instrument, or a hot substance may be applied to it, and there will be no complaint made of its producing pain.

This loss of sensation does not last, generally, longer than fifteen or sixteen hours in the same parts at one time, being very changeable in its situation. The premonitory symptoms are usually observed in this form of lead disease.

In treating this disease the sulphurous bath should be resorted to once per day, and also by applying stimulants to the skin, such as mustard, blisters, &c. &c. If these do not relieve the symptoms the strychnine should be resorted to, as previously directed, and also the croton oil treatment pursued. This course of treatment generally relieves the case. The diet should be the same in this as directed for lead paralysis, and the precautions there given must be remembered while treating this disease.

The most important remarks on the subject of lead remain yet to be made, which is, the means to be made use of for preventing the influence of lead on the human system.

One way in which it gets into the system of those that work in it, is the dissemination of small particles in the air; to prevent this from being swallowed, or breathed, is the great object. In the first place, the establishment in which the men work should be commodious, and so arranged that cur-

rents of air will pass in every way through the building, thus carrying out the particles of lead, that would otherwise remain, and a portion of which would be taken into the system of those employed in working therein.

To increase the current of air, there should be a fire-place and chimney in the building. The fire-place should be deep, and a constant fire kept up, thus rarefying the air.

Every two weeks, a purgative should be given to those working in paint shops, and places where lead is apt to be taken into the system. Either croton oil, jalap, rhubarb and aloes, or Epsom salts, may be taken.

It has been recommended by high authority, for persons exposed to lead-poison, to make use of tobacco, and I think it a good rule so to do, smoking, or chewing, or both may be followed with advantage.

The strictest rules about cleanliness should be observed. The workmen should clean their hands and face well, before drinking, or eating; if not, they are apt to get some small particles of lead into the bowels, by swallowing it with their food.

They should never go to meals without washing their hands in one or two different waters; they should never put anything into the mouth while in the shop; and no water should be kept standing in the establishment that is to be used for drinking, or washing the face and hands. Should there seem difficulty in washing off the collection from the hands, some sulphuret of potassium may be put into the water.

Workmen sometimes carry their dinner with

them to the shop, to save time; this should never be done; no food ought ever be eaten in the establishment.

They ought to wash the teeth and mouth, once or twice per day, with water in which has been put some charcoal, and they should use also every evening, a tooth-powder composed as follows:—

Take Myrrh, pulverized,	$\frac{1}{2}$ ounce ;
Orris Root	“ $\frac{1}{2}$ ounce ;
Peruvian Bark	“ $\frac{1}{2}$ ounce ;
Cinnamon	“ “ 2 drachms.

Mix well together. Take the brush and use as ordinary tooth-powder every evening, before taking any food.

It will be of advantage for workmen to bathe two or three times a week, in warm water; and, occasionally, if they could take the sulphurous bath, it would prove a great preventive. Soap and water is also a good means of cleaning the surface.

An oil-cloth suit should be worn constantly, while at work, covering the person from head to foot, fitting close round the neck. The garments of course should always be taken off when leaving the establishment for the purpose of taking meals.

The floor of the workshop should always be kept damp, during working hours; and vessels of water should stand in the house constantly, being so made that they offer a large surface, which will take up the lead particles. This water should be renewed every two or three days. Old pieces of canvas kept damp, and hung up in the shop, will

be of advantage in taking up the lead dust floating in the air.

Another excellent preventive to the inhaling or swallowing of lead is a sponge, so adjusted that it fits the mouth and nose. This should be of the finest sponge, and kept constantly moist. It should be washed several times in the course of the day. Should there be holes of any size in the sponge, they should be closed up by means of a needle and thread, drawing them together. The sponge is kept in its place by strings carried round the head.

Persons engaged in working lead, ought to use good substantial food, consisting of vegetable and animal diet.

It is thought by some that a milk diet is a good preventive against the attacks of lead disease: it is directed to be taken warm. It is worth a trial at any rate.

Workers in lead should not be intemperate in their habits; not that the intoxicating drinks are more injurious in this than any other instance, but during a state of partial drunkenness they are very liable to neglect those means that are their safeguards, while working in lead.

Those that are engaged principally in painting houses, and painting of like character, should do their mixing in the open air, unless the weather is too cold, and the room in which it is then done should have a current of air passing through it all the time.

When old paint is to be scraped off, it should be moistened with water, a few minutes before commencing. Thus the dust that would arise, is pre-

vented by the moisture, and there is then no danger of inhaling the particles of lead.

The same remark will apply to pumicing, *i. e.* moistening.

It has been proposed that the carbonate of zinc be substituted for the lead in painting, and I think it a good suggestion ; for, by doing this, the dangerous effects of lead are obviated, and we have a paint that, though not so brilliant when first put on, holds its own much better than the lead.

When we consider the amount of human suffering produced by lead, the sacrifice of health and happiness, and loss of life, it is time that something was done to prevent it. In the carbonate of zinc we have the remedy at hand ; let it then become a matter of serious consideration to those concerned.

The adulteration of various articles of food and drink by lead, has already been considered.

Apartments that have been recently painted, should not be used ; many, many are the accidents that result from this cause, and often prove fatal, as the cause of the disease may escape the observation of the persons affected, and the attending physician also. No person should dare to sleep in a room in less time than two months after the last paint was put on, and the room has been well dried, and dried by fire.

CONCLUSION.

READER, what are your feelings since scanning the foregoing pages? Have my efforts been in vain? Do you intend to lay down this little volume and say, "Well, it's a great pity that people will not be honest, and that the public will not look more to their own interest, but I cannot do anything towards abolishing the present system of fraud."

Let me ask you, beg you, not to come to such conclusions; you *can* do something, and it is your duty to do it. Do not think that there is any exaggeration in what has been stated. I have no cause for making wrong statements, I am prompted by no other than the purest motives; I have no ends to accomplish, only bettering the condition of my fellow-men.

I have long witnessed the deleterious effects of frauds practised on the public, but not until I located in this city (New York), did I ever know to what an extent this nefarious, this unfeeling, ungodly practice, was carried, even by those holding positions in society that one would think might prevent them from such deeds of crime.

But money, "the root of all evil," very truly, what will not some men do to obtain it.

This work could have been made thrice as large as it is, but then it would not be suitable for pub-

lic reading—only for professional men, and as there are works enough written on the adulteration of medicines and many other things now, that are for medical men, I have written this little work for those that do not understand chemistry, and are strangers to medical phrases—the intention has been to do the most good, with the least outlay of time and means to the reader.

Subjects, that large volumes have been written on, have here received just attention enough to make them intelligible, and all that is important has been given without dealing in speculation; something that would not benefit the reader, but serve to render it all a mystery.

I have availed myself of every source of information, in the course of its preparation: and if the authority has not in every instance been quoted, it is not for want of a due regard for the worthy authors, but because it was not considered necessary or desirable, in a work intended to simplify things for the public, and thus bestow a blessing on mankind.

All the experiments that are given for detecting any poisonous substance in food, drink or otherwise, are perfectly simple, and can be performed by any one by following instructions. The medicines for testing can be found at any respectable drug store, or apothecary's, none of which is very costly.

It is necessary, after trying any experiment, to throw out the substances with which you have been operating, not that they are really poisonous in every or any instance, but it is the safest.

The medicine also that is procured should be

put where children cannot get it ; and always keep on the label, to prevent its being mistaken for something else.

They should always be kept in the same form as when sent from the drug store, lest they might lose their strength, and on a future occasion prove useless in making experiments, perhaps to the detriment of those concerned. The quantities of each and every substance should be strictly adhered to in making experiments, otherwise a total failure may be the result.

In purchasing medicine for testing, always ask for the *best*, as the experiment may fail unless the medicine is pure. Should the first trial at testing not prove satisfactory, the experiment should be repeated, always noticing that the directions are followed in every respect, if you wish to succeed.

In writing off the name of any article for making experiments with, be careful that you insert every letter as in the book, for a single letter left out sometimes would entirely change the character of the medicine intended.

As regards what has been said on the subject of lead, I know that the remarks are somewhat limited ; but I hope enough has been said to let the world know the many sources of lead diseases ; the course of treatment to be pursued ; the means of obviating its influence, and the danger of neglecting cleanliness while working in it, with the means also of detecting it when in fluids or solids.

The means of detecting lead are not given under any separate head, but throughout the work necessary directions have been given while speaking of lead in different articles of food and drink by

which there can be no difficulty in detecting its presence when the necessary directions are followed.

In speaking of the treatment of lead diseases, I have given what I term, and what all may term, directions for using "heroic remedies." The reasons for so doing are obvious;—*no other treatment will serve the patient.*

Some may say that none but professional men are justified in using the powerful remedies pointed out by me.

I must certainly differ with those that might make such assertions, for, by following the directions strictly, the ordinary cases of lead disease can be relieved by every person of discretion.

And now I must bring my remarks to a close; and in doing so let me say, that I am well aware of the responsibility I have taken on myself in writing this book. I know that as soon as its contents are known to the world, that there are those who will raise the cry of "false," "unfounded," and many other epithets of like character, for the purpose of putting down that which leads to truth, and the detection of their villany.

But, when you hear such persons making these pages the object of ridicule, "WATCH THEM," for if they were doing the honest and clean thing, they would not care how many tests were used to detect fraud, as they would not detect anything unless it was present.

When you have read the work carefully, do not stop at that, but immediately proceed to procure some articles, and apply the tests, and you will often find that those whom you thought honest, have been cheating you every time you dealt with them.

Hoping that what labor I have bestowed on this work will be the means of doing much good in detecting fraud, and defending honesty, I must close—and may the time soon come when a revolution in the adulteration of food and drink will take place, and never again may the nation be visited with such a calamity.

APPENDIX.

12*



APPENDIX.

To render this little work still more interesting, I have concluded to give a number of formulas, recipes, &c., which will be very useful to every family. They will consist of directions for making the various articles of perfumery for the toilet, tooth powders and washes, soaps, skin powder, preparations for the hair, &c. &c., which alone is worth more than twice the price of the work. They are not *all* original with me, but *many* of them have never been given before, and for which I claim originality. The others have been obtained from whatever sources I thought myself justified in making use of, viz., FRENCH and ENGLISH works.

There have been many works written on the art of manufacturing perfumery, &c., but they do not accomplish the object which I have in view, and which will be obtained, as I humbly believe, by me in this instance; I refer to couching the recipes, &c., in such language that all can appreciate them and make them useful if they wish. I claim here, what I have done throughout the work—"Simplifying technical terms, and applying the substance to the good of the public." It is useless for any

man to profess giving recipes for the benefit of those who live in the interior of the country, and include in those recipes articles that are so costly, or hard to procure, that the people will go without them rather than go to so much trouble and expense; whereas if the one or two ingredients which are so hard to get, or very costly, were left out, the perfume, or other compound, would be nearly as good, and would answer every purpose. Therefore, I contend, that they should be given to suit all classes—the rich, the poor, the country people, and those living in cities, and to do this will now be my object, hoping it will do good to those into whose hands this little volume may fall. The substances spoken of in the following pages can be obtained at almost any apothecary's or druggist's.

TOOTH POWDERS AND WASHES.

1. Take of Prepared Chalk $\frac{1}{2}$ ounce;
 Orris Root $\frac{1}{2}$ ounce;
 Powdered Peruvian Bark $\frac{1}{2}$ ounce;
 “ Cardamom Seed 10 grains.

Mix well together, and put up in a jar or box. With this the teeth are to be rubbed every morning.

2. Take of Powdered Cloves 10 grains;
 “ Gum Kino $\frac{1}{2}$ ounce;
 “ Cinnamon 10 grains;
 Cream of Tartar $\frac{1}{2}$ ounce.

Mix. Very good where there is a foul breath.

3. Take of Calcined Magnesia 10 grains;
 Pulverized Charcoal $\frac{1}{2}$ ounce;

Quinine	3 grains ;
Powdered Cinnamon	5 grains.

Mix. Used when there is a bad or unpleasant taste in the mouth.

4. Take of Pulverized Charcoal	$\frac{1}{2}$ ounce ;
“ Camphor	2 drachms ;
“ Rhatany Root	1 drachm ;
“ Gum Myrrh	30 grains ;
Alcohol	10 drops.

Rub the camphor with the spirit *first*, for a few moments, then mix all the ingredients and powder it fine.

5. Take of Sweet Black Birch Bark,	
pulverized,	$\frac{1}{2}$ drachm ;
Pulverized Bayberry	
Bark	$\frac{1}{2}$ ounce ;
Pulverized Sweet Lique-	
rice (Root)	$\frac{1}{2}$ drachm ;
Pulverized Extract Cate-	
chu	15 grains.

Mix. This is very useful after extracting a tooth, as it generally stops the bleeding and eases pain.

6. Take of Chloride of Lime	2 grains ;
Prepared Chalk	30 grains ;
Pulverized Peruvian Bark	$\frac{1}{2}$ ounce ;
Oil of Bergamot	5 drops.

Mix. This will remove the dark color from the teeth in a short time. It should be used once a day with a small brush.

7. Take of Carbonate Magnesia	$\frac{1}{2}$ ounce ;
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Burnt Alum	$\frac{1}{2}$ ounce ;
Rock Candy	$\frac{1}{2}$ ounce ;
Cream of Tartar	1 ounce ;
Essence of Peppermint	25 drops ;
“ Cinnamon	20 drops.

The cream of tartar should be dried by a gentle heat, then mix all the substances together and sift through a fine cloth.

8. Take of Pulverized Gum Myrrh	$\frac{1}{2}$ ounce ;
“ “ Opium	10 grains ;
“ “ Kino	2 drachms ;
“ Cardamom	
Seed	10 grains ;
Pulverized Peruvian Bark	3 drachms ;
Prepared Chalk	2 drachms ;
Essence of Cinnamon	25 drops.

Mix. This is an excellent tooth-powder, when there is any undue nervous influence at work in the parts.

9. Take of Pulverized Oyster Shells	2 drachms ;
“ Orris Root	$\frac{1}{2}$ ounce ;
Rose Pink	$\frac{1}{2}$ ounce ;
Musk	3 grains ;
Prepared Chalk	1 drachm.

Mix. Apply with an ordinary brush.

TOOTH WASHES.

1. Take of Water	3 ounces ;
Grated Horseradish	$1\frac{1}{2}$ ounces.

Let these stand for several days in a warm place ; strain it off, and add to it the following :—

Tincture of Tolu Balsam	1 drachm ;
“ Myrrh	1 ounce ;
“ Peppermint	1 ounce ;
“ Cinnamon	1 drachm.

Shake it well before using.

2. Take of Water	1 ounce ;
Chloride of Lime	1 drachm.

Shake together in a small bottle for 35 minutes, then strain and add,

Rose Water	$\frac{1}{2}$ ounce ;
Alcohol	1 ounce.

Good for disagreeable breath or foul teeth.

3. Take of Water	2 ounces ;
Alcohol	6 ounces ;
Flowers Benzoin	1 drachm ;
Pulverized Cinnamon	10 grains ;
“ Gum Arabic	15 grains ;
“ Cloves	15 grains ;
Sweet Almonds	1 drachm ;
Musk	1 grain ;
Coriander Seed	1 drachm.

Mix. Let them stand for eight days, and then boil for two hours gently, and strain through fine cloth, silk being the best.

4. Take of Powdered Cloves	1 drachm ;
“ Orris Root	$\frac{1}{2}$ ounce ;
“ Cassia Bark	10 grains ;
Alcohol	3 ounces ;
Tincture of Cinnamon	$\frac{1}{2}$ ounce ;
“ Myrrh	$\frac{1}{2}$ ounce ;
“ Peruvian Bark	ounce ;

Tincture of Spearmint	1 drachm ;
Cologne	2 drachms.

Mix. After standing three or four days, pour off and strain.

TO DESTROY THE NERVE OF A TOOTH.

This may be done by applying nitric, or sulphuric acid, the red-hot wire, or a mixture of creosote, morphine, and arsenic; but these are all unsafe, or not desirable. The simplest and best way to destroy the nerve of a tooth is, to keep it filled constantly with common cotton, which should be renewed only every third day, and in a short time there will be no sensation in the tooth whatever.

REMEDIES FOR TOOTHACHE.

1. Take of Chloroform $\frac{1}{2}$ drachm ;
 Ether, Sulphuric, $\frac{1}{2}$ drachm ;
 Laudanum $\frac{1}{2}$ drachm ;
 Spirits Camphor $\frac{1}{2}$ drachm ;
 Tincture of Cinnamon 10 drops ;
 Alcohol, or Brandy 20 drops.

Mix. Moisten a piece of cotton or lint, and put into the tooth ; or, if there is no cavity in it, put the moistened lint or cotton on the gum, or on the outside of the jaw. *Keep well corked.*

2. Take of Morphine 2 grains ;
 Sulphuric Ether $\frac{1}{2}$ drachm ;
 Spirits Nitre $\frac{1}{2}$ drachm.

Mix. Put on a piece of cotton, and insert it into the cavity of the tooth.

3. Take of Powdered Gum Kino 4 grains;
 " Burnt Alum 4 grains;
 " Opium 2 grains.

Mix. Put some of the powder in the decayed tooth, and on it some lint or cotton.

4. Take of Spirits Camphor 1 drachm;
 Oil of Cloves 10 drops;
 Tincture of Hemlock $\frac{1}{2}$ drachm;
 Alcohol 1 drachm.

Mix. Apply as directed in No. 1.

Care must be taken that none of the articles given above get into the stomach, which is apt to be the case if the patient falls asleep while they are in his mouth, for some of them are quite poisonous when they reach the stomach.

HAIR OILS, WASHES, PERFUMES, &c.ⁿ

1. Take of Castor-Oil 2 ounces;
 Spirits Hartshorn 2 drachms;
 Oil Rosemary 20 drops;
 Jamaica Rum 4 ounces;
 Oil Bergamot 15 drops.

Mix. Shake well before using.

2. Take of Castor-Oil 4 ounces;
 Tincture of Musk 1 drachm;
 " Cantharides 1 ounce;
 Spirits Camphor 2 ounces;
 Oil Rosemary 3 drachms;
 Cologne 8 ounces;
 Alcohol 4 ounces.

Mix. Agitate in a large vessel, and strain through muslin.

Either of the above are as good as the ordinary "hair tonics" vended at the present day; they are safe and pleasant, and we know what enters into their composition.

3. Take of Ground White Mustard 3 ounces;
Alcohol 1 quart.

Put the mustard in the alcohol, let stand for three days, occasionally shaking it; then strain through fine muslin, and add,

Spirits Camphor	2 ounces;
Sweet Oil	2 ounces;
Tincture Cantharides	$\frac{1}{2}$ ounce;
Cologne	3 ounces;
Oil Rose	3 drops.

This is an excellent preparation for the hair when it is falling out, or has a rough, harsh feel.

4. Take of Horseradish (grated) 1 ounce;
Strong Vinegar 3 ounces.

Let it stand in a close vessel for two days; shake it up briskly and strain through muslin, then add,

Spts. Camphor	1 ounce;
Cologne	2 ounces;
Sweet Oil	1 ounce.

This belongs to what is called "hair restoratives," and answers the purpose as well, perhaps, as any other, where the hair wants a little stimulation, or after a severe attack of sickness, when the hair has a tendency to fall out.

5. Take of Alcohol 2 ounces;
Rum 4 ounces;

Water	2 ounces ;
Tincture Camphor	$\frac{1}{2}$ ounce ;
“ Cantharides	3 drachms ;
Carbonate of Potash	2 drachms.

Dissolve the carbonate of potash in the water, and then add this to the other ingredients. Shake well for a few moments, and it is ready for use. This is a good preparation for cleansing the hair when troubled with dandruff, &c.

6. Take of Red Oak Bark (powdered) $\frac{1}{2}$ ounce ;
 Water (boiling) 1 pint.

Let it stand for three hours ; when cool strain through a fine cloth, and add to it,

Tincture of Cantharides	2 drachms ;
“ Musk	25 drops ;
Alcohol	3 ounces ;
Cologne	$\frac{1}{2}$ ounce.

This is a very pleasant hair wash.

7. Take of Lard Oil 1 pint ;
 Oil of Cloves 2 drachms ;
 “ Rosemary 2 drachms ;
 “ Cassia 25 drops ;
 “ Bergamot 20 drops ;
 “ Lemons 15 drops.

Mix. This is the ordinary hair oil.

8. Take of Sweet Oil 1 pint ;
 Oil of Cloves 1 drachm ;
 “ Lavander $\frac{1}{2}$ drachm ;
 “ Anise 10 drops ;
 “ Sweet Almonds 2 ounces.

Mix. Agitate for a few minutes in a bottle, and it is fit for use. Used as a hair oil.

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| 9. Take of Castor-Oil | 1 pint; |
| Oil of Bergamot | $\frac{1}{2}$ drachm; |
| “ Orange | 15 drops; |
| “ Roses | 3 drops; |
| “ Vanilla | 10 drops. |

Mix. This is rather costly, but a very highly flavored oil for the hair.

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|-----------------------|----------|
| 10. Take of Sweet Oil | 1 pint; |
| Peruvian Balsam | 1 ounce. |

Mix. And let them stand for a week, shaking well together two or three times a day. Pour off, and add,

- | | |
|------------------|------------|
| Oil of Roses | 1 drachm; |
| “ Vanilla | 2 drachms; |
| “ Bitter Almonds | 1 drachm; |
| “ Jessamine | 2 drachms; |
| “ Amber | 1 drachm. |

Mix. A very fine hair oil.

POMADES.

- | | |
|----------------------|----------------------|
| 1. Take of Fine Suet | 1 pound; |
| Clarified Lard | $\frac{1}{2}$ pound; |
| Oil of Almonds | $\frac{1}{2}$ ounce; |
| “ Bergamot | 10 drops. |

Melt the suet and lard together in a tin vessel, and then add the other substances.

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| 2. Take of Pure Ox Marrow | 1 pound; |
| Sweet Oil | 4 ounces; |
| Oil of Lemon | 1 drachm; |

Oil of Bergamot	$\frac{1}{2}$ drachm ;
“ Cloves	25 drops ;
“ Cassia	20 drops.

Melt the ox marrow and sweet oil together ; let them cool, and then beat with a twisted wire until they have a creamy appearance, at the same time adding the other ingredients.

3. Take of Spermaceti	4 ounces ;
Sweet Oil	1 pint ;
Oil of Almonds	1 pint ;
“ Orange	3 drachms ;
“ Bergamot	$\frac{1}{2}$ ounce ;
“ Lemon	$\frac{1}{2}$ ounce ;
“ Rose	5 drops.

Put the spermaceti, sweet oil, and oil of almonds in a tin vessel, and melt together, then add the others.

These pomades should be poured into suitable jars when in the melted state, and kept closely covered. If they are likely to become rancid add to them a little alcohol, which will preserve them.

HAIR DYES.

1. Take of Milk of Sulphur	1 drachm ;
Sugar of Lead	30 grains ;
Rose Water	6 ounces ;

Mix, and bathe twice a day, for two weeks ; and the hair will become very dark.

A.

2. Take of Lunar Caustic	2 drachms ;
Rain, or distilled water	2 ounces.

Dissolve the caustic in the water.

B.

Take of Solution of Hydro-Sulphuret

of Ammonia	$\frac{1}{2}$ ounce ;
Water	1 ounce.

Mix. Moisten the hair with A first, and then with B, which will turn the hair black immediately. In applying this to the hair, never let the fluid touch the skin, but moisten the hair by means of dipping a comb in the solution, and combing it.

3. Take of Lunar Caustic 1 drachm ;
 Sap Green $\frac{1}{2}$ drachm ;
 Hot Water 1 ounce.

Mix. And use as directed in No. 2, always bearing in mind that the preparation is a virulent poison. Should any of the preparations, 2 or 3, be taken by accident, such as is sometimes the case with children, you always have an effectual antidote at hand, viz. : dissolve a tablespoonful of common salt in half a tumbler of water, and let it be taken immediately. This converts the poison into a new substance which is entirely inert and harmless.

PREPARATIONS FOR THE SKIN.

1. Take of Almonds (blanched) 4 ounces ;
 Cologne 1 ounce ;
 Rose water $\frac{1}{2}$ ounce ;
 Tincture of Catechu $\frac{1}{2}$ drachm ;
 White of one egg.

The husks can be taken off the almonds by pouring on them hot water ; they should be then beaten to a paste in a mortar or other suitable ves-

sel; then add the white of egg and the rose water, the Cologne, and tincture of catechu, and make into a paste. This is an excellent remedy for sore or cracked lips, and chapped hands or face.

2. Take of Sweet Oil	3 ounces;
Oil of Sweet Almonds	1 ounce;
“ Poppies	1 ounce;
“ Bergamot	$\frac{1}{2}$ drachm;
“ Lemon	10 drops;
Peruvian Balsam	$\frac{1}{2}$ drachm;
Spermaceti	1 ounce;
White Wax	1 ounce;
Oil of Cassia	5 drops.

All, except the P. balsam, is to be put into a tin vessel, and melted gradually over a vessel of boiling water; then stir well for a few minutes and add the balsam. This is used to hide any unsightly scars or marks, on the face, neck, hands, or arms; also, to cover little pimples, or large freckles. It should be a little warmed at the fire and applied with the fingers, after which a little starch may be dusted over it. If properly made, and used with discrimination, it will be highly gratifying to those who need it.

3. Take of Green Tansy	2 ounces;
Buttermilk (fresh)	8 ounces;
Cologne	2 drachms.

Put the tansy in a bowl and bruise it well, then add the milk and Cologne; let stand for one hour, and it will be fit for use. Apply this with a soft linen rag, twice or three times a day, and it is

said by many, that it will remove freckles in a short time.

4. Take of Dilute Muriatic Acid $\frac{1}{2}$ drachm ;
 Brandy 1 ounce ;
 Rose water 4 ounces ;
 Tincture of Cantharides 2 drachms.

Mix. Used for the same purpose as the above.

5. Take of ground White Mustard 1 ounce ;
 Alcohol 4 ounces.

Mix. Let stand for three days; shake it well and strain through fine muslin, then add,

- Cologne $\frac{1}{2}$ ounce ;
 Oil of Sassafras $\frac{1}{2}$ drachm ;
 Tincture of Musk $\frac{1}{2}$ drachm.

This is also used for removing freckles, and will be found as innocent, perhaps, as any preparation that is used for that purpose ; if the skin becomes tender or has a burning sensation during its application, its use must be discontinued. A little of preparation No. 1, recommended for chapped hands, &c., will be a good application if those symptoms arise. As soon as they pass off the medicine can be applied again.

6. Take of Sweet Oil 2 ounces ;
 Oil of Sweet Almonds 2 ounces ;
 White Wax 2 ounces ;
 Balsam Peru 1 drachm ;
 Alkanet Coloring Oil 10 drops.

Melt, with a gentle heat, and stir until cold. This is the common *Rose Lip Salve*, used for sore or cracked lips. Otter of Roses and Oil Almonds are also sometimes added.

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| 7. Take of Sweet Oil | 3 ounces; |
| Spermaceti | $\frac{1}{2}$ ounce; |
| White Wax | 4 ounces. |

Melt these in a tin vessel, and stir briskly until cold. This is the *White Lip Salve*, which has so long been used as a remedy for sore lips.

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| 8. Take of Lard | 4 ounces; |
| White Wax | $\frac{1}{2}$ ounce; |
| Spermaceti | $\frac{1}{2}$ ounce; |
| Oil of Bergamot | 10 drops; |
| Rose Water | 1 ounce. |

Melt and stir until cold. This makes what is termed *Cold Cream*, used for putting on the skin, to render it soft and smooth.

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| 9. Take of Starch (finely powdered) | 1 pound; |
| Powdered Orris Root | $\frac{1}{2}$ ounce; |
| Oil of Bergamot | 10 drops; |
| Loaf Sugar (powdered) | 1 ounce. |

Mix. This is what is known as "*Harmless Skin Powder*."

10. *Lily White.*

This is made as follows: Take fine Paris White, and form it into a mass by the addition of pure water; it is then made up into cakes of proper size by the use of small round or square rings of copper or other metal, about half an inch wide and one fourth of an inch thick; it is then put aside to dry. When thoroughly dried, the cakes can be smoothed and rounded off and neatly put up in boxes encircled with cotton.

11. Take of Boiling Water	1 pint;
Castile Soap	$\frac{1}{2}$ ounce;
Cologne	3 ounces;
Rose Water	$\frac{1}{2}$ ounce.

Mix. Used for softening the skin.

PERFUMES FOR SCENT BOXES, &c.

Take of Coriander Seeds (powder)	$\frac{1}{2}$ ounce;
Cloves, powdered,	$\frac{1}{2}$ ounce;
Tonquin Beans	1 drachm;
Lavender Flowers	$\frac{1}{2}$ ounce;
Orris Root, powdered,	2 ounces;
Benzoin	$\frac{1}{2}$ drachm.

They must all be in fine powder, then mix. This is a very pleasant perfume for a scent bag, box, or for a trunk, &c.

2. Take of Powdered Calamus Root	1 ounce;
“ Rose Buds	1 ounce;
“ Orris Root	2 ounces;
“ Cinnamon	$\frac{1}{2}$ ounce;
“ Cardamom Seed	2 drachms;
Musk	3 grains.

Mix. Used as No. 1.

3. Take of Powdered Cinnamon	$\frac{1}{2}$ ounce;
“ Mace	$\frac{1}{2}$ ounce;
“ Ginger	1 drachm;
“ Musk	5 grains;
“ Cloves	15 grains;
“ Calamus	
Root	20 grains;
“ Coriander	
Seed	1 drachm;

Powdered Cardamom	
Seed	25 grains ;
“ Rose Buds	1 drachm ;
“ Orris Root	$\frac{1}{2}$ ounce ;
“ Myrrh	1 drachm ;
“ Cascarilla	
Bark	1 drachm ;
Dry Orange Peel	$\frac{1}{2}$ ounce ;
Vanilla	10 grains ;
Tonquin Beans	5 grains ;
Dry Bergamot Peel	$\frac{1}{2}$ drachm.

Mix well together. This is one of the finest perfumes that is made, for scenting boxes, clothing, powder puffs, &c.

4. Take of Powdered Calamus Root	$\frac{1}{2}$ ounce ;
“ Ginger	1 drachm ;
“ Cinnamon	10 grains ;
“ Cloves	$\frac{1}{2}$ drachm ;
“ Musk	$\frac{3}{4}$ grains ;
“ Coriander	
Seed	15 grains ;
“ Myrrh	10 grains ;
Dry Orange Peel	1 drachm.

Mix. This is a cheap, but truly a delightful perfume ; most of the ingredients can be had in the farthest interior of the country. In preparing any of the above perfumes, if there is any article that is not agreeable to those who may wish to prepare a perfume for themselves, they can omit it.

PERFUMES FOR THE HANDKERCHIEF, &c.

1. Take of Tincture of Musk	$\frac{1}{2}$ drachm ;
“ Cinnamon	$\frac{1}{2}$ drachm ;
“ Cloves	$\frac{1}{2}$ drachm ;

Alcohol	1 pint;
Oil of Bergamot	1 drachm;
“ Lemon	$\frac{1}{2}$ drachm.

Mix. An agreeable perfume for the handkerchief.

2. Take of Alcohol	1 quart;
Oil of Bergamot	$\frac{1}{2}$ drachm;
“ Orange	$\frac{1}{2}$ drachm;
“ Cloves	$\frac{1}{2}$ drachm;
“ Sassafras	$\frac{1}{2}$ drachm;
“ Lavender	$\frac{1}{2}$ drachm;
“ Rosemary	$\frac{1}{2}$ drachm;
“ Anise	10 drops.

Mix. Used as the first.

3. Take of Alcohol	1 quart;
Tinct. of Musk	20 drops;
“ Myrrh	10 drops;
“ Guaiacum	15 drops;
“ Cinnamon	20 drops;
Compound “ Cardamom	1 drachm;
“ Cascarilla	$\frac{1}{2}$ drachm;
“ Ginger	$\frac{1}{2}$ drachm;
“ Tolu	$\frac{1}{2}$ drachm;
“ Catechu	20 drops;
“ Orange Peel	1 drachm.

Mix. This is a recipe that is rather odd, but on the whole, cheap and pleasant. I have never seen it before, and suppose no one else ever did, it is so complex.

4. Take of Alcohol	1 quart;
Spirits Camphor	1 drachm;
Oil of Lemon	$\frac{1}{2}$ drachm;

Oil of Cinnamon	$\frac{1}{2}$ drachm ;
“ Cloves	10 drops ;
“ Bergamot	1 drachm ;
“ Rosemary	$\frac{1}{2}$ drachm ;
“ Lavender	$\frac{1}{2}$ drachm ;
“ Neroli	10 drops.

Dissolve the oils in the alcohol. This is what has long been called “Cologne,” an excellent article, but not equal to the Cologne made by distillation, the process for making which could be given here, but it would be useless, as it requires apparatus that none but manufacturing perfumers keep.

5. Take of Oil of Orange	$\frac{1}{2}$ drachm ;
“ Bergamot	$\frac{1}{2}$ drachm ;
“ Lemon	1 drachm ;
“ Lavender	$\frac{1}{2}$ drachm ;
Tincture of Cloves	1 drachm ;
“ Cinnamon	1 drachm ;
Alcohol	1 quart.

The oils are dissolved in the alcohol, and afterward, 1 quart of diluted alcohol (equal parts of alcohol and water) is added. This is the common Cologne.

6. Take of Alcohol	2 quarts ;
Oil of Lemon	$\frac{1}{2}$ ounce ;
“ Lavender	1 drachm ;
“ Bergamot	$\frac{1}{2}$ ounce ;
“ Orange	$\frac{1}{2}$ ounce ;
“ Cloves	$\frac{1}{2}$ drachm ;
Bay Rum	2 ounces ;
Oil of Cinnamon	$\frac{1}{2}$ drachm ;
Tincture of Carda- mom Seed	2 drachms.

Dissolve in the alcohol. This is a good Cologne for hair-dressing, or at least is the one generally used by hair-dressers.

7. Take of Bay Rum	6 ounces ;
Cologne	6 ounces ;
Tincture of Musk	$\frac{1}{2}$ drachm ;
Spts. Camphor	$\frac{1}{2}$ ounce ;
Oil of Nutmegs	$\frac{1}{2}$ drachm ;
Oil of Origanum	$\frac{1}{2}$ drachm ;
Alcohol	2 ounces.

Mix.

8. Take of Rose Water	$\frac{1}{2}$ pint ;
Orange Flower Water	$\frac{1}{2}$ pint ;
Tincture of Cloves	2 drachms ;
“ Musk	1 drachm ;
“ Vanilla	2 drachms ;
“ Cinnamon	$\frac{1}{2}$ drachm.

Mix.

9. Take of Cologne	2 ounces ;
Lavender Water	2 ounces ;
Rose Water	2 ounces.

Mix.

10. Take of Alcohol	1 pint ;
Water	1 pint.

Mix, and then add

Tincture of Musk	$\frac{1}{2}$ drachm ;
Bay Rum	2 ounces ;
Cologne	2 ounces ;
Rose Water	1 ounce.

11. Take of Carbonate of Ammonia

(pulverized)	1 ounce ;
Oil of Lavender	10 drops ;
“ Bergamot	15 drops.

Put the ammonia into a large mouth vial, and drop the oil on it. This is a pleasant smelling salt.

12. Take of Carbonate of Ammonia
 (pulverized) 1 ounce;
 Oil of Rose 3 drops;
 " Lemon 10 drops.

Proceed as in the last.

13. Take of Carbonate of Ammonia
 (pulverized) 1 ounce;
 Oil of Orange 10 drops;
 Tincture Musk 5 drops.

As in No. 11.

14. Take of Sulphuric Ether 2 ounces;
 Oil of Bergamot 10 drops;
 Tincture of Musk 5 drops;
 Oil of Lemon 15 drops.

Mix. Keep well corked. This is an extremely odoriferous preparation, owing to the ether being so very volatile.

15. Take of Nitrous Ether 2 ounces;
 Oil of Orange 10 drops;
 Tincture of Cinnamon $\frac{1}{2}$ drachm;
 Oil of Caraway 10 drops.

Mix. Another very pleasant perfume, and as rare as it is pleasant.

16. Take of Alcohol 2 ounces;
 Chloroform $\frac{1}{2}$ ounce;
 Sulphuric Ether 1 ounce;
 Tincture of Musk 1 drachm;
 Oil of Roses 5 drops;

Oil of Orange	15 drops ;
“ Lemon	15 drops ;
“ Sassafras	10 drops.

Mix. Keep well corked. The combination given above of substances so different from each other, is indeed a remarkable one, and no one will ever regret having purchased the materials to make it, when they have tried it ; the exhilarating influence on the human system is wonderful. There is one precaution necessary in its use, that is, it must be used in *moderation*.

17. Take of Alcohol	6 ounces ;
Oil of Cloves	25 drops ;
“ Bergamot	$\frac{1}{2}$ drachm ;
“ Lavender	20 drops ;
“ Orange	10 drops ;
Concentrated Vinegar	4 ounces.

Mix. This is termed aromatic vinegar, and it is a very pleasant perfume.

18. Take of Cologne	2 ounces ;
Strong Vinegar	1 ounce ;
Bay Rum	1 ounce ;
Tincture of Cloves	$\frac{1}{2}$ drachm.

Mix.

19. Take of Water of Ammonia	2 ounces ;
Carbonate of Potash	$\frac{1}{2}$ ounce ;
Essence of Cinnamon	$\frac{1}{2}$ drachm ;
“ Lemon	$\frac{1}{2}$ “
“ Cloves	$\frac{1}{2}$ “
Alcohol	4 ounces ;
Water	3 “

Mix. Aromatic Spirits.

20. Take of Pulverized Nutmegs	$\frac{1}{2}$ ounce;
“ Sage	2 drachms;
“ Coriander	
Seed	3 drachms;
“ Cardamom	2 drachms;
“ Cloves	3 drachms;
“ Caraway	3 drachms;
“ Camphor	$\frac{1}{2}$ ounce;
“ Lemon	$\frac{1}{2}$ ounce;
“ Cinnamon	2 drachms;
Strong Vinegar	1 quart.

Put all into a vessel and let stand 15 days, well covered; then stir up well with a small wooden spatula, express and strain through muslin.

21. Take of Sulphuric Ether	2 ounces;
Strong Vinegar	$\frac{1}{2}$ ounce;
Cologne	2 ounces;
Tincture of Myrrh	2 drachms;
Spirits Camphor	2 drachms;
Spirits Nitre	$\frac{1}{2}$ ounce.

Mix. Either of the last two aromatics will be found very pleasant, to pour a little into a saucer or other open vessel in a sick chamber, where there are any unpleasant odors arising from the patient, owing to his sickness, such as fevers, &c.

No. 20 will be useful for scenting a room in which a number of persons are collected together, as at parties, balls, and other places.

SOAPS, &c.

1. Take of White Soap	3 ounces;
Carbonate of Potash	1 drachm;
Alcohol	12 ounces.

Dissolve the soap and potash in the alcohol, and then strain. This is called "the essence of soap."

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| 2. Take of Pure Palm Oil | 8 ounces; |
| Subcarbonate of Potash | $\frac{1}{2}$ ounce; |
| Benzoin | 2 drachms; |
| Alcohol | 1 pint. |

Mix. Let stand for ten days, and then strain through muslin.

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| 3. Take of White Soap | 2 ounces; |
| Oil of Bergamot | 10 drops; |
| " Lemon | 10 drops; |
| Alcohol | 4 ounces. |

Dissolve the oils in the alcohol, then add the soap which has been previously cut into fine shavings. Let stand for two days; and strain through muslin.

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| 4. Take of White Soap | 2 ounces; |
| Oil of Orange | 10 drops; |
| " Cinnamon | 10 drops; |
| " Cloves | 5 drops; |
| Tincture of Musk | $\frac{1}{2}$ drachm; |
| Alcohol | 8 ounces. |

Proceed as in the last. These essences must all be kept in a tight jar, or they will soon lose much of their rich flavor, and be unfit for use.

CONFECTIONS.

1. *Confection of Almonds.*

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| Take of Almonds (sweet) | 8 ounces; |
| Gum Arabic, in powder | 1 ounce; |
| Sugar | 4 ounces. |

Having macerated the almonds in cold water, and deprived them of their external coat; beat all the ingredients together till they are thoroughly incorporated. The confection may be kept longer, if the almonds, gum Arabic, and sugar, separately rubbed, should be afterwards mixed. Then, whenever the confection is to be used, beat the whole together until incorporated.—*London Disp.* This can be very greatly improved by the addition of powdered cloves, or grated nutmegs.

2. Confection of Orange Peel.

Take of Fresh Orange Peel, separated from the fruit by grating $\frac{1}{2}$ pound;
 Refined Sugar $1\frac{1}{2}$ pound.

Beat the orange peel, with the sugar gradually added, till they are well mixed; then add,

Powdered Gum Arabic	3 ounces;
“ Cinnamon	$\frac{1}{2}$ drachm;
“ Coriander	
Seed	10 grains;
Essence of Sassafras	15 drops;
Brandy	2 ounces.

Mix. This is the formula given by the *U. S. Dispensatory*, with the addition of the gum Arabic, cinnamon, coriander, essence Sassafras, and brandy.

MISCELLANEOUS ARTICLES.

1. Take of Chamomile $\frac{1}{2}$ ounce;
 Boiling Water 1 pint.

Macerate for ten minutes in a covered vessel and strain.—*U. S. Disp.* Add to this,

Diluted Alcohol 2 ounces,

And it will keep for a length of time, retaining an odor as pleasant as when first made; taken warm it is a diaphoretic drink.

2. *Lemon Syrup.*

Take of Juice of Lemon, strained, 1 pint;
Sugar, refined, $2\frac{1}{2}$ pounds.

Dissolve the sugar in the lemon juice by the aid of a gentle heat; then set it aside for twenty-four hours; afterwards remove the scum, and pour off the clear liquor from the dregs, if there be any.—*London Disp.*

3. *Syrup of Mulberries.*

Take of Mulberry Juice, strained, 1 pint.
Sugar, refined, $2\frac{1}{2}$ pounds.

Dissolve the sugar in the mulberry juice with a gentle heat, and proceed in the same manner directed for syrup of lemons.—*London Disp.*

Syrups can in like manner be prepared from *Raspberries, Blackberries, Strawberries, &c., &c.*, and used by sick persons, by means of adding an ounce or two of the syrup to a pint of cold water, for allaying thirst.

If the syrups have any disposition to become *acid*, as they sometimes do in warm weather, when prepared from *unripe* fruit, this can be prevented by adding a little good brandy.

4. *Essence of Cinnamon.*

Take of Cinnamon, bruised, 3 ounces ;
Diluted Alcohol 2 pints.

Macerate for fourteen days, express, and filter through paper.—*U. S. Disp.*

5. Take of Cinnamon, bruised, 1 ounce ;
Cardamom Seeds, bruised, $\frac{1}{2}$ ounce ;
Ginger, bruised, 3 drachms ;
Diluted Alcohol 2 pints.

Macerate for fourteen days, express, and filter through paper.—*U. S. Disp.* This is the compound tincture of cinnamon of the *U. S. Disp.*, and is much pleasanter than the common essence of cinnamon.

6. *Essence of Peppermint.*

Take of Oil of Peppermint 2 fluid ounces ;
Alcohol 1 pint.

Dissolve the oil in the alcohol.—*U. S. Disp.*

7. *Essence of Cloves.*

Take of Oil of Cloves 2 fluid ounces ;
Alcohol 1 pint.

Dissolve the oil in the alcohol.

8. *Essence of Lemon.*

Take of Oil of Lemon 1 fluid ounce ;
Alcohol 1 pint.

Dissolve the oil in the alcohol.

9. *Essence of Sassafras.*

Take of Oil of Sassafras	1 fluid ounce ;
Alcohol	1 pint.

Dissolve the oil in the alcohol.

10. *Essence of Bergamot.*

Take of Oil of Bergamot	1 fluid ounce ;
Alcohol	1 pint.

Dissolve the oil in the alcohol.

THE END.

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